Vol. I MAY, 1919 No. 2

THE PAPER INDUSTRY

A Monthly Educational Journal Devoted to the Paper Industry.

JUN 4 - 1920

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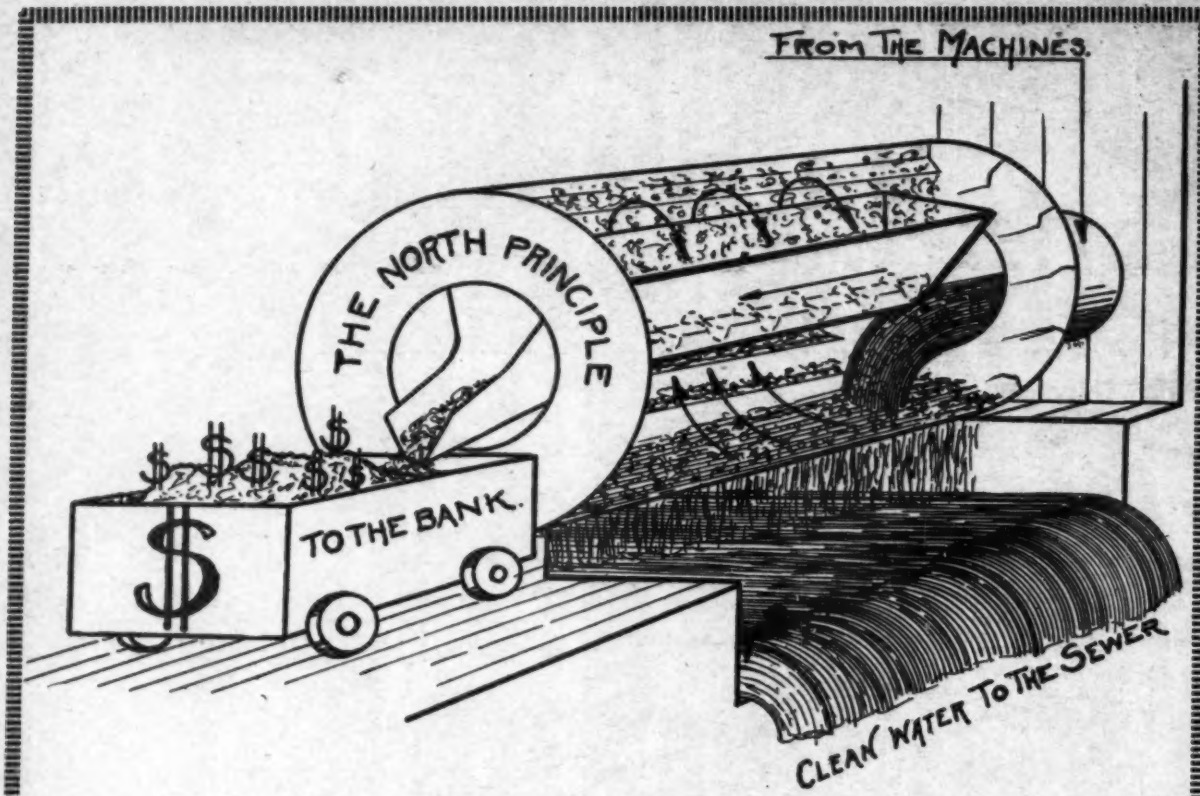

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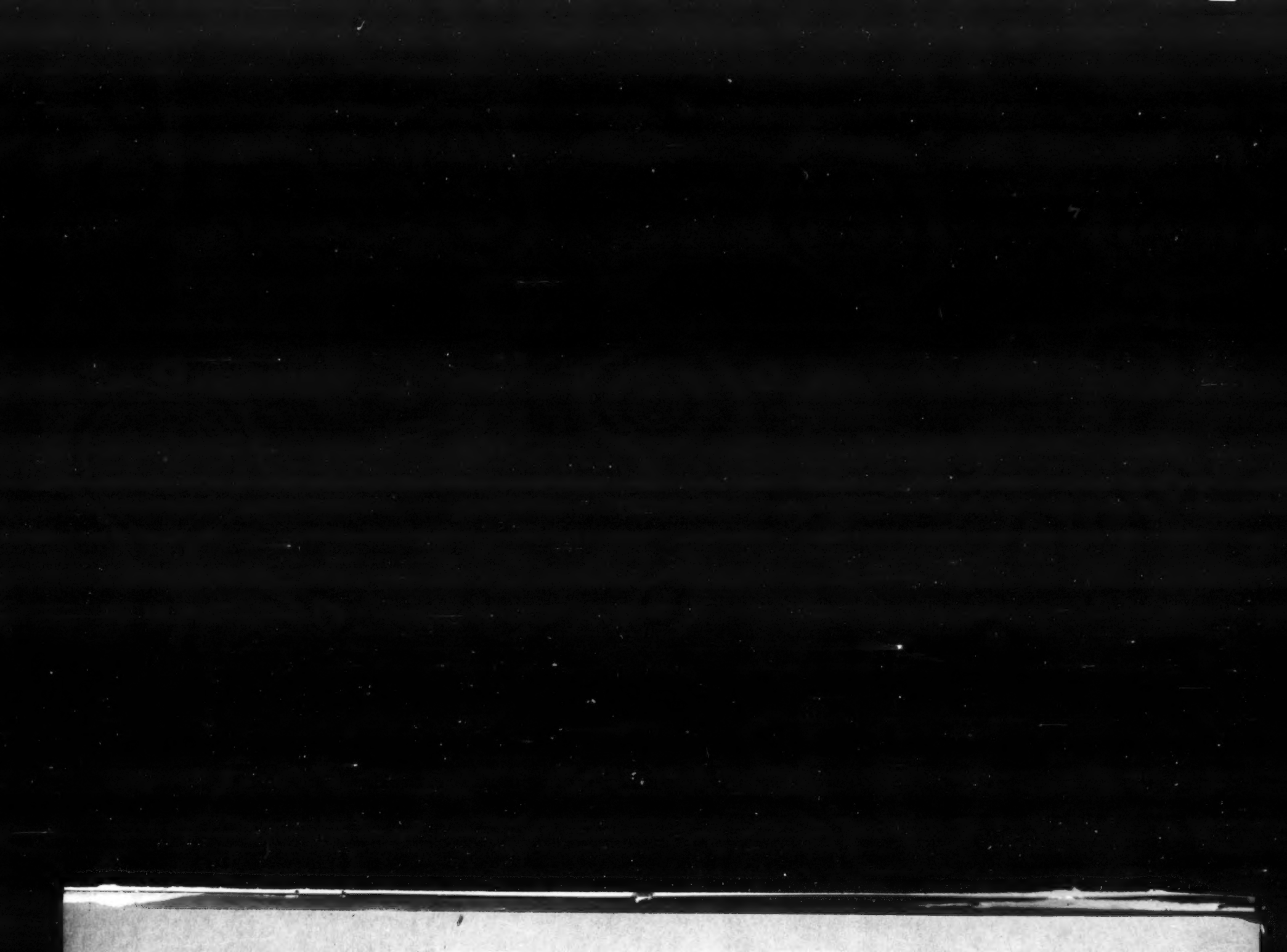

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¶ Just at present, we'll say, you require a new Winder, Bleacher, Cutter, LayBoy or Pump, for your mill. As a man of keen business judgment do you order these new machines at random and without a careful investigation of their merits? No, you do not! YOU DON'T GROPE IN THE DARK ABOUT SUCH MATTERS. The machine you purchase must be of proven worth.

¶ We will not attempt here to extol the merits of our machinery. What we would like to have you do is to get a proposition from us the next time you are buying new equipment.

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2700 No. 15th Street

Philadelphia Pa. U. S. A.

Vol. 1—No. 2

THE PAPER INDUSTRY

PETER J. MASSEY
Editor

THE MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of The Paper Industry

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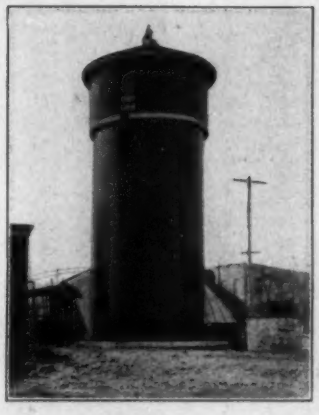
IN addition to enabling you to produce better paper for less expense, a Graver treating plant will keep scale out of your boilers, increase their efficiency, eliminate costly delay for repairs and save coal.



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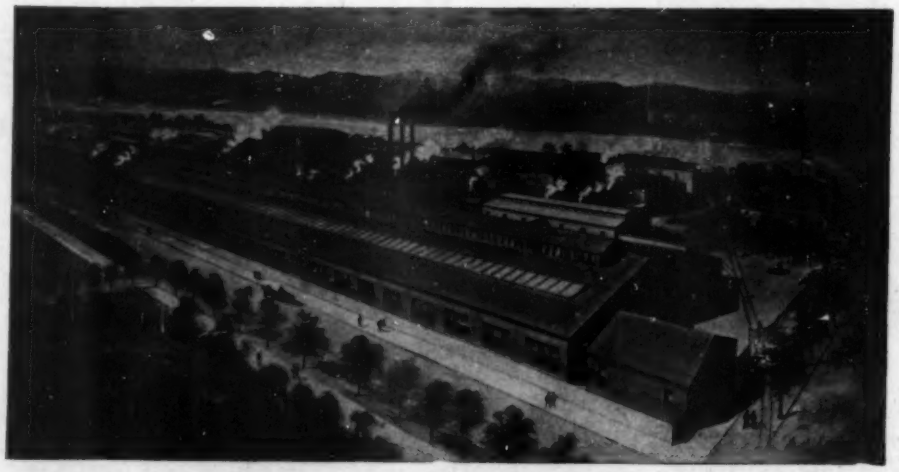


WORKS—OAKMONT, PA.

DURWARD EARLE BURCHELL

THE President of the Cost Association of the Paper Industry is also controller of the Eastern Mfg. Co., Bangor, Maine and of the Clinton Wire Cloth Co., Boston. Mr. Burchell has been actively engaged as a Production Engineer for the past thirty years.

The Cost Association held a Convention under the auspices of the American Paper and Pulp Association on May 14-15, at the Blackstone Hotel, Chicago. The amount of interest shown in this subject by the Paper Industry was reflected at this meeting by the large number of mills represented.

¶ Magnify it as much as you like.

¶ Make any test you wish.

¶ Examine the warp and the woof.

¶ Run it on your machine and you will always find that

"Appleton Wires are Good Wires"

APPLETON WIRE WORKS

Appleton, Wis.

What About Tomorrow?

MANY men in the different industries have been worrying considerably recently, wondering what the future had in store for them, and wondering whether we were to have the same conditions that prevailed before 1914—that is, in competition with German made goods. This applies to certain manufacturers of material that goes into the manufacture of paper. The two branches of manufacture that I have particularly in mind are American makers of colors, and wires.

We all know that before the war started we were at the mercy of the German manufacturers of colors, dependent upon them for anything that we wanted. We know that as soon as the war started it was impossible almost to get anything in the shape of colors. To those of us who have kept abreast of the times and have seen the great strides made among the American manufacturers of colors, we must realize that today practically everything that is needed in the manufacture of paper in the shape of colors can now be secured from American manufacturers, and we are no longer dependent on foreign countries.

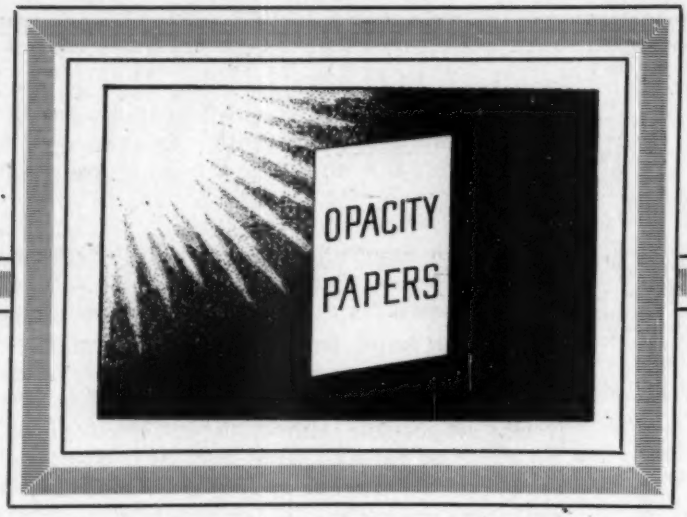
We also know what happened to the manufacturers of Fourdrinier wires early in 1914; how the country was flooded with wires from Germany, and the effect it had on our manufacturers. Some of the paper manufacturers refused to buy these imported wires, but others "threw down" the American wire people and stocked up with German-made wires. This, they thought, was good business, because the German wires cost a little less money, and so it was—but it turned out to be a bad move, for as soon as the war was started and no more German wires came in, the paper manufacturers rushed orders to the American wire makers, and it was really a pitiful thing to see how these mills begged the wire people to take their orders, but most of them who had heretofore bought German wires received little comfort. The wire manufacturers naturally took care of those mills that helped them out when German wires were selling at a lower price. The moral to all this is: How about tomorrow? We wonder how many paper mills would *now* buy German wires or German colors if they had the opportunity.

We do not think there are many of them. It is hardly possible that any paper manufacturer is at this time willing to again help build up Germany's industries. Too many of us have sons or brothers or relatives or friends who are sleeping their last sleep in France, or are maimed for life, to forget that part of every dollar that we spent for goods made in Germany went to help build up the German war machine.

We do not believe the American paper manufacturers would today use German-made colors or German-made wires, nor do we think any of the present generation will ever do so.

THE PAPER INDUSTRY stands for American industries today and always. This publication does not desire any advertising from manufacturers or their agents of German-made colors or German-made wires, and has directed its representatives not to solicit any such business.

America and American-made goods, today, tomorrow and always.



BRYANT

Kalamazoo, U. S. A.

World's Largest Manufacturers of

Opacity Book and Catalog Papers

PLANTS OF THE BRYANT PAPER CO., KALAMAZOO, MICH.

EDITORIAL

"We are especially interested in your Editorial, in which you suggest an American Pulp and Paper Superintendents association. This we believe, would be very valuable to the industry and think it is just as essential as the American Pulp & Paper Association to the managers of the mills."—Mill Manager.

"The Editorial suggesting an American Pulp and Paper Association struck the right chord as it is a necessity for the progress of our industry."—Superintendent.

"You may be assured of our support in organizing a superintendents' association."—Mill Manager.

"The writer has long had in mind something along the same lines as your Editorial, an association where the superintendents may get together and exchange ideas and if there is anything I can do to help along do not hesitate to ask for assistance."—Superintendent.

The above comments, taken at random from some of the letters we have received in regard to the "Hit-the-line-together" Superintendents' Associations Editorial in our April number, prove conclusively that an organization of this character is necessary to further the progress of the Paper Industry.

While we expected that it would cause some debate, the volume of favorable comment, on this Editorial, was beyond our most sanguine expectations, and proves conclusively that the industry is alive to the importance of immediate action in this matter, so that the organization will be able to render some assistance in solving the problems now confronting the Paper Industry.

There is no class of men in the industry more eminently qualified to assist in the solution of these problems than the Pulp and Paper Mill Superintendents, if they were given the opportunity of development and expansion in an organization, where the various problems confronting them would be thrashed out by means of constructive criticism and calm discussion.

Never in the history of the Paper Industry, were the problems more serious and worthy of discussion than at the present time, when great economic changes are of almost daily occurrence, and the labor unrest is a universal evil.

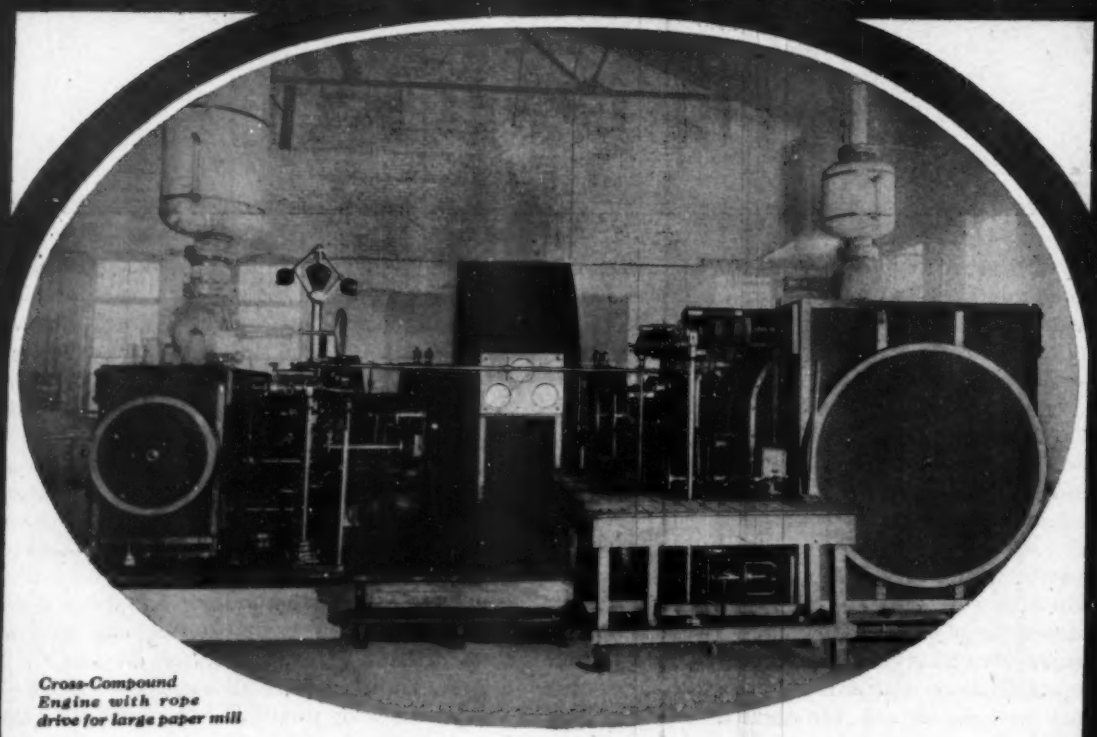
The superintendent is the connecting link between capital and labor in the Paper Industry, it is he who directs and superintends the conversion of raw material and raw labor first into half stuff and trained workers, and finally into a finished product and a perfect producing organization; it is he who is on the line of scrimmage continuously, always fighting the various problems that develop in the manufacturing processes. Who then is more conversant with or more qualified to discuss the various problems confronting the industry, with the management, than the superintendent. The labor problem at the present time is one of the most important problems confronting us, and there surely is no class of men more conversant with the actual facts and conditions relating thereto than the superintendents, as they not only come into contact with this problem every day, but in the majority of instances they have reached their present positions through having the faculty of knowing how to handle men.

They know by practical experience the causes underlying their individual problems in this matter so that it only needs the constructive criticism and intelligent discussion in a meeting of a Superintendents' Association to enable the Paper Industry to make available for use, a large fund of practical knowledge, that could be formulated in some basic laws or principles to solve the present problem and bring about an era of industrial peace.

To be of assistance in solving the Labor problem would more than compensate the efforts and time expended to bring about the immediate organization of an American Pulp and Paper Superintendents' Association, without taking into consideration the invaluable aid that could be derived from an organization of this kind in such problems as cost finding, increased production, deficiencies in raw materials, training of labor, perfecting the producing organization, improving processes and establishing loyalty and morale.

All of these problems are not forecasts of future conditions, they are the vital questions confronting us today, now, right this minute, and it behooves us to get busy if we are going to do anything, and do it NOW!

Let the local branches be immediately organized by calling a meeting of all the Pulp and Paper Mill Superintendents, in each of the following localities: Appleton, Wisconsin; Kalamazoo, Michigan; Hamilton, Ohio; Holyoke, Massachusetts; Watertown, New York; where the local problems may be discussed and the various committees formed to launch the national organization.



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Paper Mills

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PRICES ARE STABILIZED

The predicted demand for coarse papers has come!

From all sections of the country THE PAPER INDUSTRY has been receiving reports of sharp increases in the number of orders and the volume of tonnage received at the wrapping paper mills for shipment. The one significant instruction which each order bears is "RUSH," which is indubitable evidence of the low stocks of wrappings in the hands of both consumers and jobbers.

As is always the case in declining markets in any line of merchandise, the jobbers and consumers hold off, expecting to buy their requirements at the lowest point; and as always happens, none of them realize or recognize the low point when it is reached.

The result is the same now as ever before, only intensified by the fact that never before in the history of the wrapping paper industry has such a drastic liquidation for so long a period prevailed.

Let us review the situation briefly.

On November eleventh last, the armistice was signed. The next day wrapping paper specifications received by the mills fell off seventy-five per cent. Why? Because both jobbers and consumers had purchased and held on hand heavy stocks of paper; and in addition the jobbers generally, had specifications out with the mills anticipating their demands some ninety days ahead. All these specifications had been put out on the premise that war would continue on into 1919. Likewise, the mills without exception, under the urge of the War Boards, had during the late summer and fall of 1918 laid in heavy supplies of all raw materials sufficient to run them through what was predicted to be the hardest winter of the war, when the suddenness of the armistice upset everyone's calculations.

The jobbers at once stopped issuing further specifications, but be it said to their everlasting credit that we of THE PAPER INDUSTRY have yet to hear of one single instance where a jobber cancelled his specifications for stock with his mill. He took the stock, paid the price, and the mills were thus enabled to run on into January on these outstanding specifications.

But presently the specifications were cleaned up, and no new ones in sufficient volume to maintain running schedules were received by the mills. Then ensued an era of price adjustment.

Various manufacturers, in vain hope of stimulating business, reduced prices and thus automatically shut off entirely the placing of any orders by consumers and jobbers who saw prices declining.

The decline continued during March and April, all of which had the effect of making the liquidation more and more thorough.

The decline in wrapping paper prices, however, was not precipitate—it was gradual; and as there was no movement of new stock into the markets, and as consumers had only the stocks in the hands of the jobbers to draw on, May first arrived and found a very thoroughly purged situation, so far as excess stocks in the hands of jobbers and consumers were concerned.

In the meantime an average decline of about twenty percent from fair wartime prices had taken place. Mill prices generally were right down on top of or into costs. Even then some additional reductions of mill prices were announced which had a further tendency to check buying, which by that time was somewhat overdue. Then the unexpected happened.

On Monday, the twelfth of May, several large mills in the country were reported shut down on account of labor troubles and strikes. Some mills sent out notices withdrawing their quotations. Others announced advances, so that today there is imminent another vicious phase of the aftermath-of-the-war market which is, that all these consumers, converters and jobbers who together have been withholding their orders will shortly move together to the mills with the certainty of congestion of orders, a rise in prices and disappointing deliveries; and speaking of disappointing deliveries, bear in mind the fact that the depression in the paper market during the first five months of this year came concurrently with a general depression in kindred lines of merchandise all over the United States, and that the revival in the paper business is coming concurrently with the revival of business generally all over the country, PLUS the movement to market of the most stupendous wheat crop in the history of the continent, the movement and handling of which is to tax to the point of collapse the ability of the railroads to transport.

The advice of THE PAPER INDUSTRY to all its readers is—PLACE YOUR ORDERS EARLY AND AVOID THE RUSH.

This country, the one lone producing nation left on earth able to produce the necessary food, clothing and the manufactured goods which the world is clamoring for, is now, today, entering upon an era of agricultural and industrial prosperity that will stagger the resources of the nation to care for.

It is here. It has come. We cannot escape it nor get away from it any easier than a man can escape his hide.

R.J. DOWD · KNIFE · WORKS
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MACHINE KNIVES
1847
BELOIT · WIS

¶ Better cutting edges for every paper mill need go a long way toward that increased production.

¶ And DOWD makes these better cutting edges and makes each one especially for the particular work it is to do.

¶ It's this DOWD experience—plus scientific methods of manufacture that makes Paper Mills specify DOWD products for the most important work.

Roll bars and bed plates of every description. Barker, Chipper, Paper, Rag Knives, etc., etc., have been made for Paper Mills by DOWD of Beloit for more than seventy years.

R.J. Dowd Knife Works
Makers of better cutting knives since 1847
Beloit, Wis.

A BIG DETROIT FACTORY
Daylight increased by the use of Truscon Industrial Enamel

Was the Light Good?

Do you remember seeing that question? It appears on every "Notice of an Accident to an Employee." But it can always be answered by "Yes," or, better still, need seldom be answered at all if the interior walls of your factory are coated with

Truscon Industrial Enamel

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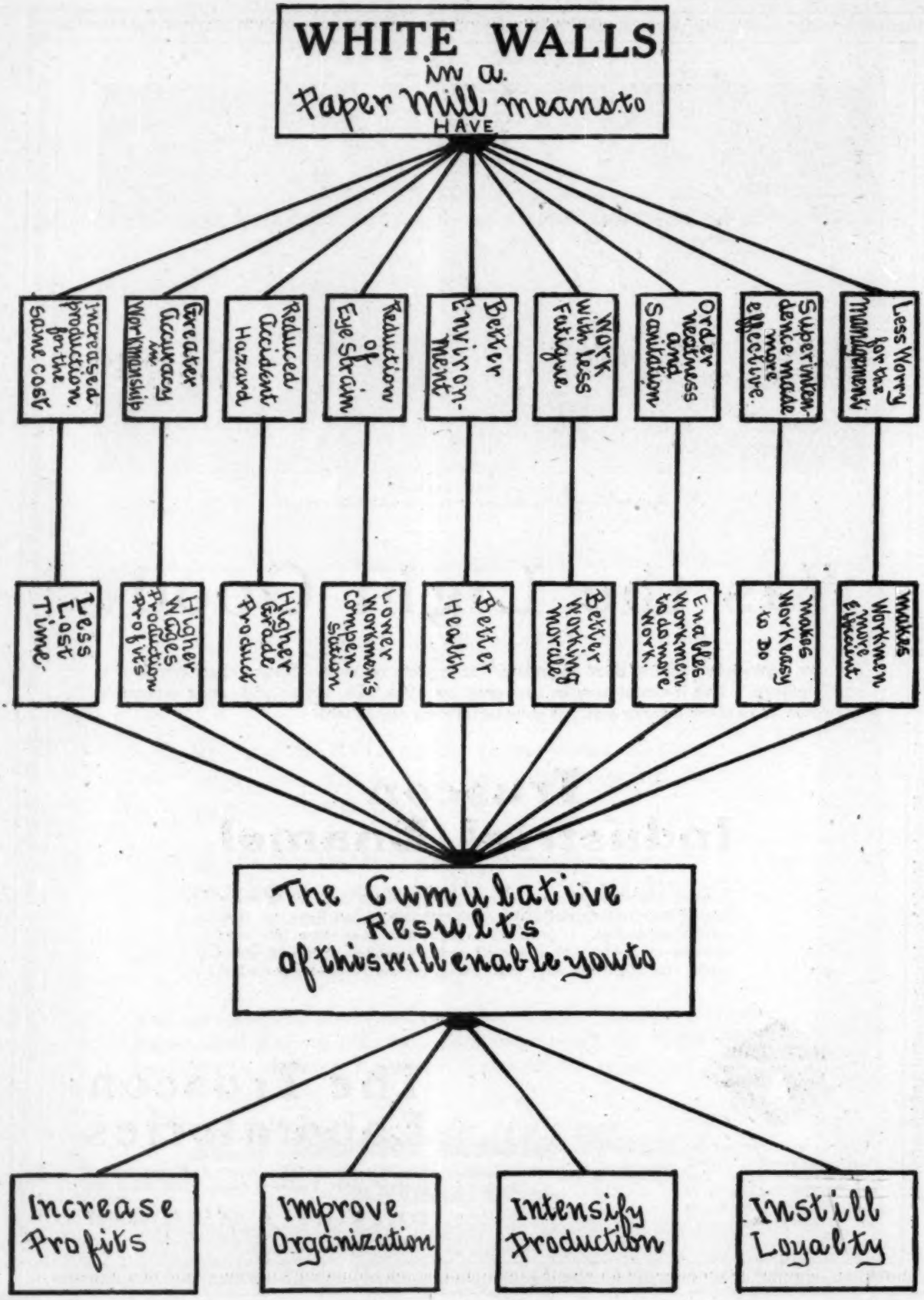
DETROIT : MICHIGAN


WHITE WALLS
in a
Paper Mill means to
HAVE
Increased production for the same cost
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Reduction of Eye Strain
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Work with less Fatigue
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Supervision made more effective.
Less Worry for the management
Less Lost Time
Higher Wages Production Profits
Higher Grade Product
Lower Workmen's compensation
Better Health
Better Working Morale
Enables Workmen to do more Work.
Makes Work Easy to Do
Makes Workmen more Efficient
The Cumulative Results of this will enable you to
Increase Profits
Improve Organization
Intensify Production
Instill Loyalty

THE PAPER INDUSTRY

"The Educational Magazine for the Paper Industry"

Volume I MAY, 1919 Number 2

ILLUMINATION

Advantages by Use of White Walls

By EDWARD B. FRITZ

[The writer has been visiting the paper mills for the last twenty-five years, which makes him particularly qualified to point out the contrast in conditions brought about by having clean surroundings.]

THE upkeep of a paper mill and its efficiency are inseparable; you cannot have one without the other.

A paper mill is not complete before depreciation begins, and it continues throughout the life of the mill. Auditors give a mill a certain number of years to live, and charge off a portion of the plant to depreciation each year. The average life of a mill's efficient usefulness is about fifteen years, and the conservative average depreciation is 6 per cent a year.

Depreciation

Depreciation works at an accelerating speed; two years of successive neglect will do five years' damage. To prevent this and keep below the 5 per cent limit, you must be constantly on the watch that the upkeep is not neglected, improving constantly so as to ward off the wear and tear of depreciation.

Wear, rust and rot know no bounds, add to this a little neglect and your plant will deteriorate so rapidly as to make it a physical impossibility to overcome, without an extensive shutdown for the necessary replacement of some of your mill units.

The only preventative for excessive depreciation is upkeep. Constant attention to it will retard depreciation and accelerate production.

Upkeep

The rising curve of upkeep cost in buildings growing old is paralleled to a rising production curve that earns not only the cost of the upkeep, but stabilizes your plant investment, and nets a profit for dividend and surplus.

Clean, white walls are one of the main essentials for the maintenance of proper upkeep, and give the mill the character you want to see reflected in your products.

The walls of a paper mill can go without paint indefinitely, but the mill cannot go on without production. White walls will give you production and individuality, while it would be impossible for you to achieve these results with dark, dirty walls.

On many occasions while traveling among the paper mills I have tried to show to the paper industry the great value of white paint for walls of paper and pulp mills, and am pleased to note that this advice has been heeded in many instances. I am sure that there is not one mill in America that has spent money for a good mill white paint that regrets

having made the experiment.

The two latest mills that have been built at Kalamazoo are two of the best examples that I know of showing the value of white walls. The Riverview Coated Paper Company has done everything possible in this connection. Every wall in this great plant is coated with mill white. From the floor up to about six feet the walls are coated with a battleship gray, topped by a black line around the room. Above that black line the walls are a pure white, with all of the water pipes painted red, and the other pipes, except those that are covered, are black.

Capitalize Cleanliness

I was talking with a gentleman connected with the trade some time ago, a man who visits most of the mills in this country, and he said to me, "That Riverview mill at Kalamazoo is the prettiest paper mill in America, and one in which the employees ought to be happy while working."

The Kalamazoo Vegetable Parchment Company's new mill, also at Kalamazoo, have all of their walls the same pure white, and one of their advertised slogans is that this is the cleanest mill in America. Making, as they do, wrappers for food products, they capitalize cleanliness.

An Investment

Some mill men have asked me if I thought it paid to spend enough money to coat the walls white. I not only do think so, but can state positively that it has paid for itself many times over wherever it has been adopted. So promising have the results been that I do not know of one reason why this should not be done except the cost, and it is well recognized that everything that is good or worth while costs money.

Morale

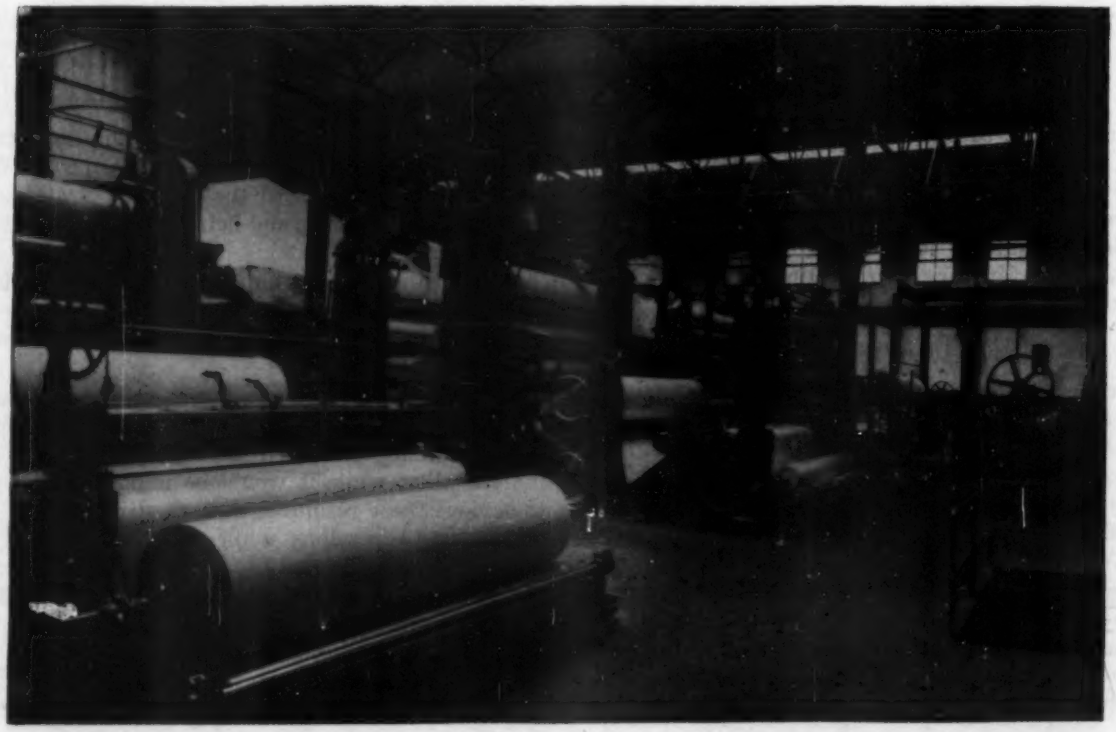
The wage worker's efficiency is dependent upon his surroundings; light, cheerful working conditions produce good, cheerful, efficient workers; and as mechanical efficiency is dependent upon man efficiency, the employer must see that the worker is kept in fit physical and mental condition to render the highest percentage of service for the day wage.

Efficiency

To work swiftly and accurately, one must be able to see clearly. To see clearly there must be good light. To use the words of a well-known authority on lighting, "Good lighting is such that a person is as unconscious of it as he is of daylight. That is to say, it is so entirely a part of his surroundings that he does not give it a thought one way or the other."

Better Light

The importance of proper lighting is shown by the growth of a new profession, that of illuminating engineer. Illuminating engineering societies exist both in this and in most other countries. An article by one of the best of them appeared in the last issue of this journal, and others will follow. The information published by them on lighting arrangements



best adapted for factory use shows an intimate knowledge of the subject and has resulted in the establishment of many fixed principles that cannot be ignored by the student of lighting problems.

Advantages Gained

While the necessity of good natural and artificial light is so evident that a list of its effects may seem commonplace, these same effects are of such great importance in their relation to paper mill management that they are well worth careful attention. The effects of good light, both natural and artificial, and of bright, cheerful interior surroundings include the following items:

1. Reduction of accidents.
2. Greater accuracy in workmanship.
3. Increased production for the same labor cost.
4. Less eye strain.
5. Promote better working and living conditions.
6. Greater contentment of the workmen.
7. More order and neatness in the plant.
8. Reduction in labor turnover.

Safety First

A few years ago, when all of the paper mills used only two shifts in twenty-four hours, it was a well-known fact that most of the accidents in the mills occurred late in the afternoon, when the light began to wane, or in the early hours of the day, showing in most cases it was on account of the strain under which the men had been working and at the time when the light was at its worst. I believe it is still true that even now, when there are three shifts, that most of the accidents, in the daytime at least, occur late in the afternoon.

Take the list of accidents alone, from the published lists of a number of states, together with a conservative estimate from the remainder. We find that approximately 25,000 persons are killed, 500,000 seriously injured, and 1,000,000 slightly injured each year. From these figures it may easily be calculated how many persons are killed and seriously injured every year by poor lighting, as the insurance companies state that approximately 22½ per cent are due to inadequate industrial lighting.

Elimination of Seconds

I fully believe that any paper mill with dark and dingy walls has more seconds or sheets that will have to be thrown out than would be the case if the walls were white. It is also true that of two mills, one with white walls and the other with dark walls, the percentage of seconds and waste would be much greater in one than in the other, and this difference would soon pay for the cost of the coating of the walls, without taking into consideration any of the other great advantages to be gained.

In support of this contention the U. S. Census report of 1909 stated that the gross spoilage of American factories that year was $150,000,000, and that $28,125,000 of that amount was due to poor and insufficient lighting methods or poor light.

Up to a few years ago, summer spun cotton goods

brought a better price than winter spun goods, because that made in summer was made under better lighting conditions; but since textile mills have in the main adopted the plan of coating their walls white, today winter spun cottons bring the same price as summer made goods.

Reduction of Broke

It would no doubt be impossible to arrive at any direct figures on the subject of spoilage in a paper mill, but I am sure if the average paper mill manager could know of the amount of seconds and spoilage in his mill that is directly attributable to poor light, he would be astounded. The amount of "broke" on the average paper machine would be much less if the mill was light than if the room was otherwise, for the reason that a break in the sheet, or any other defect, on going over the machine, could be seen much sooner and remedied much easier.

One of the best known insurance companies stated some years ago that during that year 19,000 accidents had occurred in and about industrial plants, and that 23.8 per cent of these were traced directly or indirectly to improper light. It should be borne in mind that proper light will not only safeguard the employee against accidents, but will protect the employer from the charge of negligence on account of poor lighting, in case of accident.

Better Attendance

One authority has stated that the average loss for every workman on account of poor light is from one to two hours a day, which may or may not be the case in paper manufacturing plants; but I fully believe it is this much in sorting rooms, etc., and at least a considerable time each day in every department of the mill.

Another authority has stated that it takes four and one-half times as much electrical energy for the proper illumination of dark walls as against the same walls when painted white. As every paper mill runs twenty-four hours a day, it would seem from this that the same light there would do four and a half times the good in mills where the walls were white than in mills where they are not white, or, in other words, it would take considerable less electricity to light up the plant.

Labor Turnover

The labor turnover—that leak in profits which all industries are trying to stop, can be greatly reduced in your plant by the use of white walls.

It has been proven that where there are two factories engaged in the same industry, in the factory having dingy walls and indifferent light the labor turnover was 70 per cent more than in the one having clean white walls and good illumination. This item alone will more than cover the cost of this improvement, and relieve you of the strain occasioned by this problem, as your workmen will then be better satisfied, less tired of their day's work, have a more pleasant attitude toward your company, and make them more loyal, relieving your organization of a large amount of the supervision otherwise necessary for the production of good work.

Women Workers

White walls will simplify your problem of the women workers even more effectively than the men, as the women are more sensitive to their surroundings than the men; they are more influenced by bright, cheerful rooms in which to work. It will therefore remove the only objection to female labor, that it is indifferent to the needs of working every day, as I know of many cases where brightening up the workrooms has greatly cut down this inconsistency of female labor, with consequent reductions in the labor costs.

Saving in Power

Painting the walls of your mill white will result in a large saving in power and give you much better illumination for less cost, improve the quality and quantity of your work, reduce labor turnover, instill loyalty, and perfect your organization.

So I feel that the money spent in painting your mill is one of the best investments you can make.

The Testing of Paper and Paper Products for Specific Uses

By J. D. MALCOLMSON

PAPER testing is a topic upon which a great deal could be written, and, in fact, a number of excellent articles have already been published on this subject. Much of this matter deals with paper testing in its more general aspects, and the field has been covered very thoroughly. Most of the future work on paper testing will probably be directed, therefore, to special tests of papers for specific uses.

Most papers are usually studied under some, or all, of the following headings:

Fibre composition and chemical tests;
Fibre distribution;
Nature of filler used;
Nature of sizing;
Thickness;
Weight per standard unit (ream, etc.);
Bursting strength;
Tensile strength;
Folding endurance.

This classification of tests is used by the Bureau of Standards, for instance, in the routine testing of ordinary papers.

Other indications of paper quality, which depend more on personal experience than upon actual tests, are the "rattle," "feel," color, finish, opacity, etc.

Physical Tests

Many paper products are primarily intended for strength, and in such cases the bursting test, tensile test and folding endurance are of first importance. These papers include kraft and manila wrapping, bags, sheathing, lining, container boards, etc.

Bursting or "puncture" tests are made with the Mullen, Ashcroft and Webb testers. Tensile tests are made with the Schopper, Webb and Scott testers. There are several automatic instruments on the market for making folding endurance tests, and there are a few other testers of lesser importance for making bursting and tensile strength determinations. The test results are rendered more valuable for comparison purposes by reducing them to a common unit, such as "tensile strength per 0.001 of an inch thickness," "bursting strength per pound (of substance weight)," etc.

The Mullen Tester

An interesting example of a paper product demanding special tests is the familiar double-faced corrugated fibre container board. This material has thus far been tested for bursting strength with the Mullen tester,—a method which has not always proved satisfactory because it was necessary to crush the board and its valuable corrugations to a more or less disastrous extent, before making the puncture test. Although this disadvantage has long been recognized, the Mullen test has continued in use on corrugated boards because it was not found possible to adapt any of the other puncture testers to this product.

The Webb Tester

Recently, however, a new instrument, known as the Webb Tester, has been developed, which makes a very satisfactory test of corrugated boards by measuring the bursting strength of the individual components separately, without injuring the structure of the board. This tester and its action have already been fully described.[1]

Tensile Strength

The importance of tensile strength tests on paper is self-evident. They are especially valuable when made comparatively in the machine and cross directions, and are then an excellent indication of the extent to which the fibres have been distributed or "formed." By this means, papers made by the Fourdrinier and by the cylinder process can be easily distinguished, since the Fourdrinier product usually has a higher proportion of strength in the cross-direction than in the case of papers made on a cylinder machine.

Shrink and Stretch

The ability of a paper to stretch is intimately connected with its tensile strength, and the amount of this stretch is often determined simultaneously with the tensile strength. Papers with a relatively low proportion of strength in the cross-direction usually stretch much more in this direction than in the machine-direction. It is often of importance, also, to determine the relative amount of shrinkage that a paper is liable to under different atmospheric conditions.

Formation

In general, it is desirable that a paper have its fibres distributed as evenly as possible in all directions. This minimizes divergencies in tensile strength and shrinkage. Such an objective is perhaps most perfectly realized in such instances as map

[1] See "Journal of Industrial and Engineering Chemistry," Feb., 1919, page 133.

and chart papers, record rolls for player pianos, etc., in which shrinkage (and especially unequal shrinkage or expansion) would prove very undesirable. At the other extreme may be cited straw paper to be used for corrugating purposes. This paper is merely intended to form a "cushion" and is not subjected to appreciable tensile stresses. It must, however, possess a maximum of strength in the machine-direction in order to withstand the rather severe crimping action of the corrugating rolls. These corrugations are always made across the machine-direction of the paper.

Tearing Strength

Closely allied to tensile strength is the ability of a paper to resist tearing stresses. It is very difficult to evaluate such stresses into actual figures, and, until very recently, no satisfactory method for doing so had been developed. Within the last few months, however, at least five such instruments have been described in the technical press.[2]

Folding Endurance

"Bending quality" is a property that is very desirable in certain paper products such as container board and other paper materials which must withstand more or less bending. Other paper products, on the contrary, such as bristol board, wall board, etc., are not required to possess this property. An indication of bending quality can be secured by making folding endurance tests. The bending value of container board is best determined by subjecting a sample to the same treatment which a box flap, for instance, receives when it is scored, bent outward to pack the box, and folded back for sealing. Tensile tests are made before and after this treatment, and the percentage of tensile strength remaining can be reported as an arbitrary figure to represent the bending quality. The amount of tensile strength lost in scoring and bending certain grades of container board is often surprising to one who has never determined this loss.

Kraft Lined Box Board

Container board of inferior quality is sometimes encountered which has the appearance of a good bender, due to the use of a thin skin of kraft as the outer ply. In reality, the interior of the board may be worthless as a bender. This inferiority is not visible, but the bending and tensile test just described will expose it very quickly.

Special Tests

Among other special tests which have recently been developed is an attachment to the Webb Paper Tester for measuring the adhesive bond between the liners and the corrugations of a double-faced corrugated board. This consists of an arrangement of steel fingers which are fitted snugly into five adjacent corrugations. When stress is applied by the mechanism of the instrument, these fingers tear the board apart and a calibrated gauge records this stress. Another attachment measures the rigidity of the corrugated "truss" by compressing the board with a flat plate, one square inch in area, until the truss fails. Suitable gauges register the force applied in pounds per square inch and the deflection in thousandths of an inch.

Testing Cloth Tape

This same instrument is often used for testing the value of various kraft and cambric tapes which are used to seal the fourth corner of a corrugated fibre container. Such tapes naturally have a greater proportion of their strength in the machine (or warp) direction. Many cloth tapes are very weak, proportionately, in the woof direction. Yet it is this direction which takes all the stress, since tapes are glued lengthwise along the joint. A tensile machine might be used for determining this cross-direction strength of the original tape, but the Webb Tester improves on this by virtually testing the value of the taped joint. This is done by cutting an inch-wide strip across the corner and breaking the taped joint when it is bent at right angles. Interesting results occur, depending upon whether the woof threads of the tape are stronger or weaker than the adhesive bond, or even than the outer skin of the paper board to which they are glued. This test is an excellent example of the duplication of actual service conditions in a laboratory test.

Elimination of Useless Tests

The above remarks cover only a part of the recent developments in the testing of paper and its products for special purposes. These developments are an excellent indication that progressive papermakers and paper users are determined to obtain the best possible paper for each specific use. Perhaps the best method of accomplishing this is the use of specialized scientific tests which will give the most accurate measure of the desired properties of a paper. Many of the useless tests which are often made on special papers will then be automatically eliminated.

J. D. MALCOLMSON.

Mellon Institute of Industrial Research,
University of Pittsburgh,
April 18th, 1919.

[2] The Case Tester, "Journal of Industrial and Engineering Chemistry," Jan., 1919, page 49.

The Selection of Paper for Printing

By PETER J. MASSEY

THE study of paper, in its relation to printing, is one of the most important subjects of the paper industry. The uses of paper, aside from printing, are legion, as we all know, but in the form of a printed page, the greatest tonnage is consumed and most technical difficulties encountered.

Of all the materials that enter into the printed page, paper is the most important. Type, illustration, make-up, press and ink are all subordinate to the correct choice of paper. It is the foundation upon which the whole work succeeds or fails.

While paper-making is now an exact science, the choice of it is not very scientific, being still governed by "rule of thumb" methods, such as looks, feel and price, without consideration for any other factors in the production of a perfect printed page.

The Three Factors

In the selection of paper for printing, there are three prime factors to be considered. They are, the press, ink available and subject-matter. Disregarding these factors will ultimately yield an unsatisfactory product.

The Press

The press is one of the inflexible tools of production, having certain characteristics peculiar to its particular type. These, of course, cannot be changed to meet all kinds and conditions of paper, so the paper must necessarily be chosen to meet the requirements of the press.

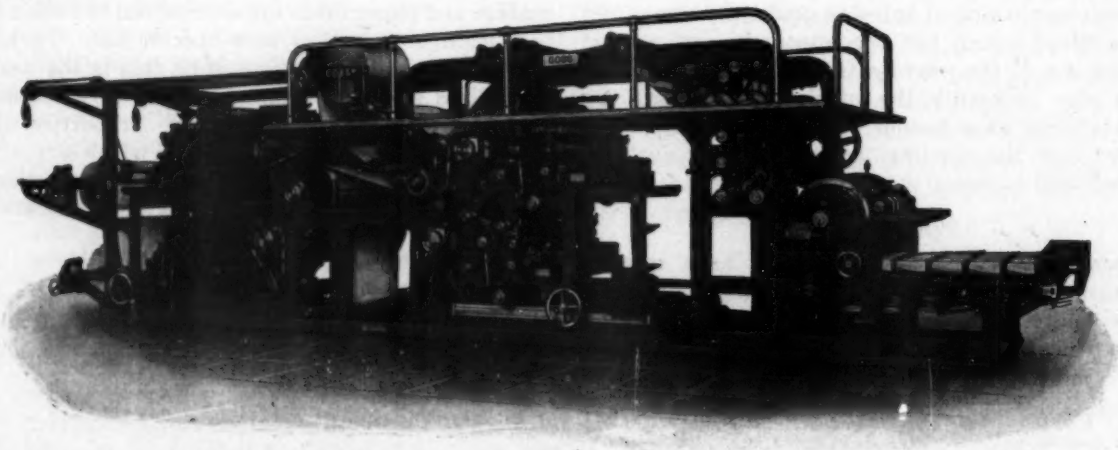
The conditions to be considered by the paper-makers in regard to the press are, its speed, ink distribution and delivery or folder. These also determine, to a large extent, the class of ink to be used. The paper must have affinity for this particular class of ink and the subject-matter will decide if a smooth surface is indispensable, and the quality of ink, as in the case of half-tone illustrated pages.

The high-speed rotary press, being the largest producer of the printed page, from the first-class magazines and catalogs to telephone directories and newspapers, is a good criterion for the requirements of a printing paper. Here the paper is traveling at a high rate of speed, printed almost simultaneously on both sides, runs over numerous angle bars, and is then folded and piled; hence, the ink must "set" or dry thru some other means than oxidation. As the whole operation is only a matter of seconds. The only other means is thru absorption or the paper having affinity for the ink.

The Ink

The best and most satisfactory ink for this type of press is one having a good color value, so that it will yield the desired covering film with the smallest possible quantity, as the values received from a half-tone illustration are in inverse ratio to the thickness of the ink film, the ligher the ink film necessary to properly cover the cut, the greater the tone value of all the intermediate shades.

The consistency should be what is generally accepted in the trade, as "Soft." The vehicle or varnish used should be short with just enough length to "pull down" or feed properly in the fountain; any length in excess of this will be a source of trouble,



owing to the limitations in the construction of the ink distributing apparatus and the speed with which the ink after leaving the fountain is applied to the form. The time interval is too short for the amount of cutting up and distribution necessary for a long bodied ink.

It should be as free from "tack" as possible so as to facilitate the "lifting" of the ink from the form to the paper, as well as to minimize the cracking and melting of the rollers, due to the excessive "pull" or friction exerted on the composition rollers by a tacky ink.

Many an injustice has been done to the paper mill, through holding the mill responsible for fluff and paper dust deposit on the rollers, which clogs up the print and occasions excessive "washing up" with attendant time loss; while the trouble was not due to the paper or sizing, but to the tacky ink used.

The Subject Matter

An ink with the above physical properties is the only one that will give satisfaction on rotary web presses, and the quality will be determined by the grade and price of the work to be printed. The tint or color of the paper will determine what "tones" to use, the fineness of screen, quantity and character of the illustrations will determine color value necessary to get their full tone efficacy, but no matter what the quality of the ink may be, the same physical properties are necessary for the satisfactory performance of the ink on this type of press.

Power of Absorption

The second essential, then, for printing paper must be good power of absorption of the printers' ink; the third is a smooth, even surface, capable of receiving the impression of a half-tone dot, if the printed page is to be illustrated; and it is right here where the printers and paper-makers have some misunderstandings. Smoothness of surface is accomplished by loading the sheet with some mineral matter, to fill all the interstices between the fibres, then calendering, which smooths all the hills and mountains of the antique finish to a plain surface. Should the calendering process be carried beyond this point, it becomes too drastic, as it dehydrates the fibres and filler, destroying their powers of absorption; it is then just as difficult a matter to print as so much tin or celluloid.

Absorption Compounds

The absorption compounds formed by the oils and dyes of the ink, on one hand, with the fibre and mineral of the paper on the other, are as yet not fully known. Their general physical properties, however, may readily be interpreted as mechanical mixtures, although in a few instances actual chemical compounds are formed. The degree of absorption is appreciably different with the same paper, having had various degrees of calendering. The "crushed" sheet and the sheet with a "glaze" finish, all other conditions of "furnish" and manufacture being equal, give the lowest result, having practically no powers of absorption, due chiefly to the dehydrated surface having no capillary attraction.

"Crushed" Sheet

An instance of over-calendering comes to my mind, in the case of a light-weight opacity sheet that had given trouble on the press, thru offset and smear. This paper had previously been used for book printing in which the amount of illustrations in half-tone was negligible, and had given perfect satisfaction. It was adopted for a catalog which was profusely illustrated with half-tones and was to run on a high-speed rotary press. This action was taken upon the advice of the printer, as the absorption of ink by this paper caused the impression to "set" instantly. This would allow it to be led over angle bars and formers without smearing. Being an M. F. Opacity sheet; therefore, well loaded, it had a "smooth" surface, capable of giving a good reproduction of a half-tone cut. The paper then was ideal for the conditions at hand, as it fulfilled all the necessary requirements, namely: the press, subject-matter and the ink, with the result, a perfect printed page.

After "running off" more than half the first edition, trouble developed. The paper would no longer absorb the ink and smeared and offset very badly. This was first attributed to the ink, then to the sizing; yet tests proved both ink and sizing were identical with the sheet, which gave satisfaction. Also, the mill declared with emphasis that the "furnish" had not been changed.

The "trouble" was finally run down at the calenders on the machine, where the tender had interpreted his instructions for a well-calendered sheet into a "glaze" finish, and attempted to give what he thought was wanted by increasing the pressure on the stack, crushing the life out of the paper.

Summary

A correct paper for printing must, first, overcome the mechanical limitations of the press; second, it must have good powers of absorption for the class and quality of ink suitable to press and subject-matter; third, it should create the desired impression and convey the information in artistic harmony with the subject-matter. The paper-maker who knows these three prime factors, when his product is selected for printing paper, and follows through each process of manufacture with them in view, will help the development of perfect understanding between consumer, printer and paper-maker in the proper selection of paper for printing.

The Analysis of Coal

By R. E. DAVIS, B. S.

IN the proximate analysis of coal the analysis consists of the determination of moisture, volatile matter, fixed carbon and ash. When the heat unit determination is added to this, one can get a fairly accurate idea of the value of the fuel. As one authority puts it, "When a proper sample of the coal is secured, the chemical analysis and the calorimetric determinations for B. T. U. are a better guide to the value of the coal than are one or two boiler tests."

Sampling

The value of an analysis is determined largely by the method of sampling. This is especially true with coal. The sample should be a fair representative of the whole purchase, and should be preserved in such a way that no changes in composition or in moisture content are possible. In sampling shovelsful of the coal are taken from various parts of the mass, taking care that the distribution of the various substances which go to make up the mass are maintained in their relative proportions. In general the gross sample so obtained should weigh from two hundred to six hundred pounds. The larger lumps are broken up, the pile flattened out to a shallow cone and quartered. Two opposite quarters are rejected, the remaining two are well mixed and again quartered. This operation should be repeated till the sample is reduced to a few pounds. At each quartering the lumps should be reduced and the final sample should be well pulverized. When this operation has been carefully performed the laboratory sample should be a fair representative of the entire lot of coal. This sample should be placed in an airtight container.

Various Moisture Conditions

The moisture content is an important factor. Illinois coals at the mine show a moisture content varying from seven to seventeen per cent. Some West Virginia coals have as little as two per cent. With a high moisture content, much of this moisture may be lost in shipping or in storage, causing considerable shrinkage in weight. Three moisture conditions exist. Coal with all the normal moisture present is "wet coal" or "coal as received." The second moisture status is where the coal has been air-dried, so that it is in equilibrium with the moisture content of the air. The coal is then said to be "air dry." The third condition is the "moisture free" condition. This is obtained by drying the coal at a temperature of about 220° F. until all moisture is gone. Analytical values are based on all three conditions and this often leads to much confusion.

The ash content is important because the ash is the noncombustible part of the coal. The increase in the ash content seriously reduces the capacity of steam boilers because the excessive quantity of coal required to produce a horse power with poor coal makes it impossible to consume sufficient coal on the grate to deliver the necessary boiler horse power. Besides this the added expense of handling the ash must be considered, as well as its effect in reducing the temperature of the fire. The volatile matter and the fixed carbon form the combustible part of the coal. It is from them that we get our heat. They form the true coal substance.

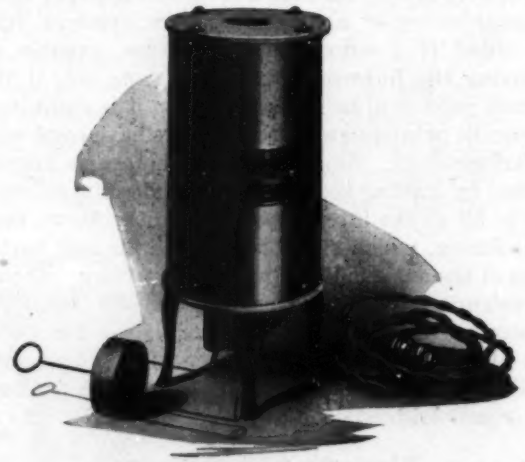
The determinations may be carried out as follows:

Moisture Loss on Air Drying

The sample as previously prepared should be spread out on a tared pan about 18x18x1½ inches. Weigh and dry at room temperature or in a well ventilated oven where the temperature is slightly above room temperature. After twelve hours the moisture content of the sample should be in equilibrium with the air, and it may be weighed. The loss in weight is moisture loss on air drying.

Total Moisture

In a dry porcelain crucible quickly weigh out one gram of the original sample. Heat with the cover



Electric oven for moisture and volatile matter

off in a drying oven maintained at 110° C. for an hour and a half. Cool in a desiccator over sulphuric acid and weigh. The loss in weight is the total moisture.

Volatile Matter

Cover the crucible containing the moisture free coal with a well fitting lid. Place on a triangle and

heat with the full flame of a blast lamp for seven minutes. Remove the flame, and when sufficiently cool place the crucible in a desiccator, cool and weigh. The loss in weight in this operation is the volatile matter.

Fixed Carbon and Ash

The cover is removed from the crucible, and the crucible heated over a low Bunsen flame till most of the carbonaceous matter is burned off. The crucible is then placed in an inclined position and heated with a blast lamp until no further loss in weight occurs. The loss in weight in this operation is the fixed carbon. The weight of the ash may be determined by subtracting the weight of the crucible from the final weight.

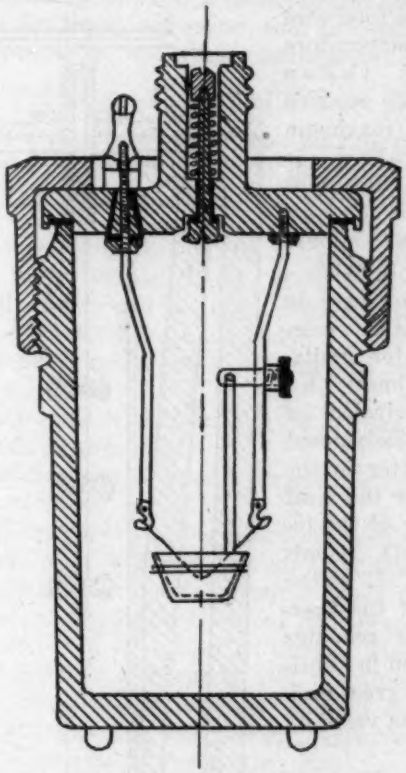
The percentages may now be computed either on the basis of "coal as received" or in terms of "moisture free" coal by using the weight of the coal left after driving off the moisture in the total moisture test.

The methods outlined here are not the methods adopted by the American Society for Testing Materials, but they are sufficiently accurate for general use, and give results which will check fairly well with those obtained by the official methods. The standard method for determining volatile matter calls for a platinum crucible. Any method which retards the transmission of heat will result in apparently lower amounts of volatile matter and larger amounts of fixed carbon. Consequently the use of a porcelain crucible usually gives slightly lower volatile matter and slightly increased fixed carbon.

Calorimeter Bomb and equipment for coal analysis

The Determination of Sulphur

One-half gram of the sample coal is mixed with sodium peroxide in a metal crucible and cautiously heated. The reaction is rather violent and the sulphur in the coal is converted to sodium sulphate. The resulting fused mass is dissolved in about 200 c.c. of water, made slightly acid with hydrochloric acid, the solution heated and barium chloride solution slowly added to the hot solution till no further precipitate forms. The precipitate is filtered off, washed, burned and weighed. The weight of the precipitate times the factor .1373 is the weight of the sulphur in the sample.



Sectional view of bomb, showing capsule of coal and fuse wire in position

The Determination of the Heat Value

The heat value of the coal is determined by burning some of the coal in a calorimeter and measuring the heat produced. The unit of heat usually considered is the British thermal unit (B. T. U.). It is the amount of heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

One gram of the air-dried coal ground to pass thru a sixty mesh screen is placed in the capsule of the calorimeter. The ignition wire is attached to the terminals and looped down into the coal. A few drops of water are placed in the bomb. The cover is then put in place and screwed down tight. Oxygen from a tank is admitted till the gauge indicates

25 to 30 atmospheres pressure. The bomb is placed in the can of the calorimeter and the electrical connections made. Two liters of water, preferably distilled, two or three degrees below room temperature, are added to the can and the thermometer put in place. The motor operating the stirring device is started, and temperature readings are taken each half minute for five minutes. The circuit is then closed thru the fuse wire and temperature readings taken each 20 seconds till the maximum temperature is reached. Readings are then taken each half minute for five minutes.

The increase in temperature (corrected for radiation) times the heat equivalent of the instrument (the water in the can plus the heat capacity of the instrument) equals the B. T. U. of the coal. If the thermometer readings are taken in Centigrade degrees multiply this value by 1.8.

Corrections should be made for radiation, for the heat generated by the burning fuse wire and for the heat generated by the formation of the nitric and sulphuric acids from the sulphur in the coal and the nitrogen in the air in the bomb.

Compute the average rise per minute for the initial five minute period. Call this r_1.

Compute the average change per minute for the final five minute period. Call this r_2.

Estimate the time at which five-sixths of the total rise in temperature has been reached. Call this time (b), the time of firing (a) and the time of maximum temperature c.

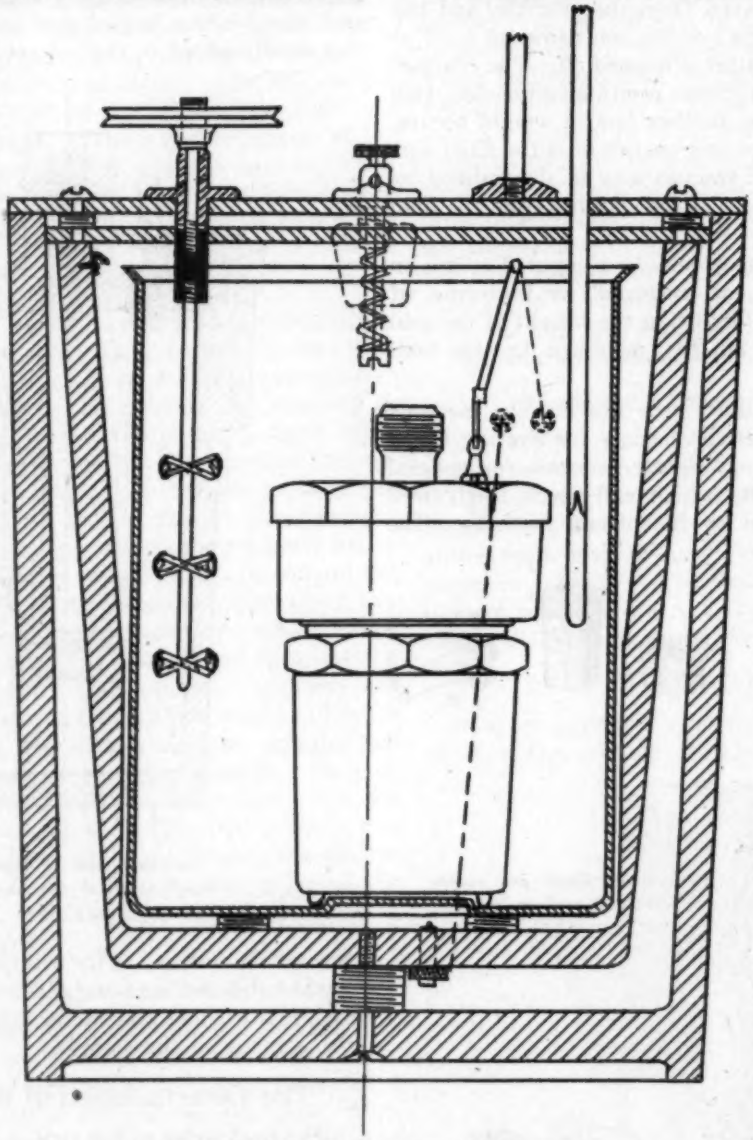
The radiation correction is then applied thus:

$(b - a) \times r_1 = t_1$ which is subtracted from the total observed rise in temperature.

$(c - b) \times r_2 = t_2$ which is added to the total observed rise.

The result so obtained is the increase in temperature corrected for radiation.

Each centimeter of the fuse wire consumed produces 4½ B. T. U. This must be subtracted from the total B. T. U. produced.



Sectional view Calorimeter ready for firing

The correction for the formation of the nitric and sulphuric acids is found by washing the bomb with distilled water and titrating the washings with a sodium carbonate solution made by dissolving 2.061 grams of pure sodium carbonate in a liter of water. Each cubic centimeter used is equivalent to 1 B. T. U., due to nitric acid. The sulphuric acid formed has produced heat units equal to 13 times the sulphur content expressed in per cent. These values should also be subtracted from the total.

To determine the heat equivalent of the calorimeter burn some standard substance of known heat value, such as benzoic acid, in the instrument. Add to the heat value of the substance used the heat due to the burning of the fuse wire and the heat due to the formation of the nitric acid. Divide the total heat value thus obtained by the rise in temperature corrected for radiation, and the result is the water equivalent of the instrument and the 2,000 c.c. of water used in it.

Coal analysis is the only method whereby you may keep informed as to the true heat value of your fuel so that your steam may be produced efficiently.

Notes on Dyes and Their Application to the Paper Industry

By H. G. BOONE
Kimberly-Clark Co.

THE subject of dyes is one in which every paper maker should be widely interested and is a subject regarding which both superintendents and mill men in general give very little attention. This has worked to their especial disadvantage during the last few years, due to the fact that, in the paper industry, as well as in every industry in which dyes are used, their importance has been so greatly magnified and distorted over usual manufacturing conditions, wherein standardized formulas could be worked out with the help of technical dye men and then rigidly adhered to. It is extremely unlikely, however, that pre-war conditions will be obtained for several years. Therefore, it is still important that every paper maker know as much as possible about dyes, their individual peculiarities, methods of determining comparative strength, etc. These notes will consist of a general consideration of the subject, followed by notes on the individual dyes themselves.

Definition

A dye may be defined as a colored substance capable of fixing itself or of being fixed on the material to be dyed. A certain substance may be a dye for some material, while not for others. As an example of this, compare the action of the common basic Green, Victoria Green, on a furnish of 100% bleached sulphite or rags with the coloration obtained with the same amount of dye on a furnish of groundwood and unbleached sulphite. A mordant is a substance capable of fixing a dye on the material to be dyed, due to the formation of an insoluble substance either within or on the surface of the fiber wall. As an example of the importance of mordants, compare the action of any acid dyed stuff used in the same amount with and without the addition of alum and size. The color of the end product obtained by the use of a dye and a mordant is due to the combination of the dye and the mordant and consequently different color combinations are possible with the same dye and different mordants. This is, however, of relatively small importance in the paper industry, for the reason that the mordant in general use is Aluminum Sulphate. This is true because of its two-fold value in precipitating the size as well as fixing the color. It is able to do this because of its acid character, while not strongly acid enough, however, to hurt the strength of the fiber itself.

It is essential, in order to understand the action of dyes on fibers, to know a small amount about the nature of the fibers themselves, both as regard their physical properties and their chemical nature.

Effect on Chemical Fibers

The physical nature of all paper making fibers is essentially the same in regard to dyeing. They all consist of long, hollow, cylindrical or flat tubes or cells, the walls of which are composed of a parchment like membrane, through which liquids can easily permeate. The dye solutions diffuse through the walls of the fibers and are there rendered insoluble by at least three different methods:

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B. Chemical combination with the mordant forming an insoluble precipitate.

C. Chemical combination with another dye, such as acids and bases.

Chemically, paper making fibers are divided into two classes: Cellulose fibers and non-Cellulose fibers. The Cellulose fibers consist, from a paper making standpoint, of wood fibers, cooked and bleached or of rag pulp, such as cotton or linen. These are saturated chemical compounds, and, therefore, tend to be non-reactive and resistant to most kinds of chemical changes. In the cooking, bleaching and heating treatment, however, they are almost invariably changed in their composition, forming such modifications as Oxycellulose and Hydrocellulose. These compounds are affected by dyes in a different manner than normal cellulose, taking up the dye from a solution with more avidity than does normal cellulose.

Mechanical Pulp

The non-Cellulose fibers consist almost exclusively of pulp made from wood ground on a stone, without any chemical treatment which materially affects the chemical constitution of the fiber. In addition to these an example of a ligneous fiber is the jute bast fibers. These, on the other hand, are all unsaturated chemical compounds, and, due to the presence of groups of slightly acid in character, they combine with that class of dyes known as basic without the aid of a mordant. Rosin sizing also plays an important role in this connection, which will be discussed later. It is probable that the natural resinous matter always present in large quantities in coniferous wood, also assists in this reaction.

25 to 30 atmospheres pressure. The bomb is placed in the can of the calorimeter and the electrical connections made. Two liters of water, preferably distilled, two or three degrees below room temperature, are added to the can and the thermometer put in place. The motor operating the stirring device is started, and temperature readings are taken each half minute for five minutes. The circuit is then closed thru the fuse wire and temperature readings taken each 20 seconds till the maximum temperature is reached. Readings are then taken each half minute for five minutes.

The increase in temperature (corrected for radiation) times the heat equivalent of the instrument (the water in the can plus the heat capacity of the instrument) equals the B. T. U. of the coal. If the thermometer readings are taken in Centigrade degrees multiply this value by 1.8.

Corrections should be made for radiation, for the heat generated by the burning fuse wire and for the heat generated by the formation of the nitric and sulphuric acids from the sulphur in the coal and the nitrogen in the air in the bomb.

Compute the average rise per minute for the initial five minute period. Call this r_1.

Compute the average change per minute for the final five minute period. Call this r_2.

Estimate the time at which five-sixths of the total rise in temperature has been reached. Call this time (b), the time of firing (a) and the time of maximum temperature c.

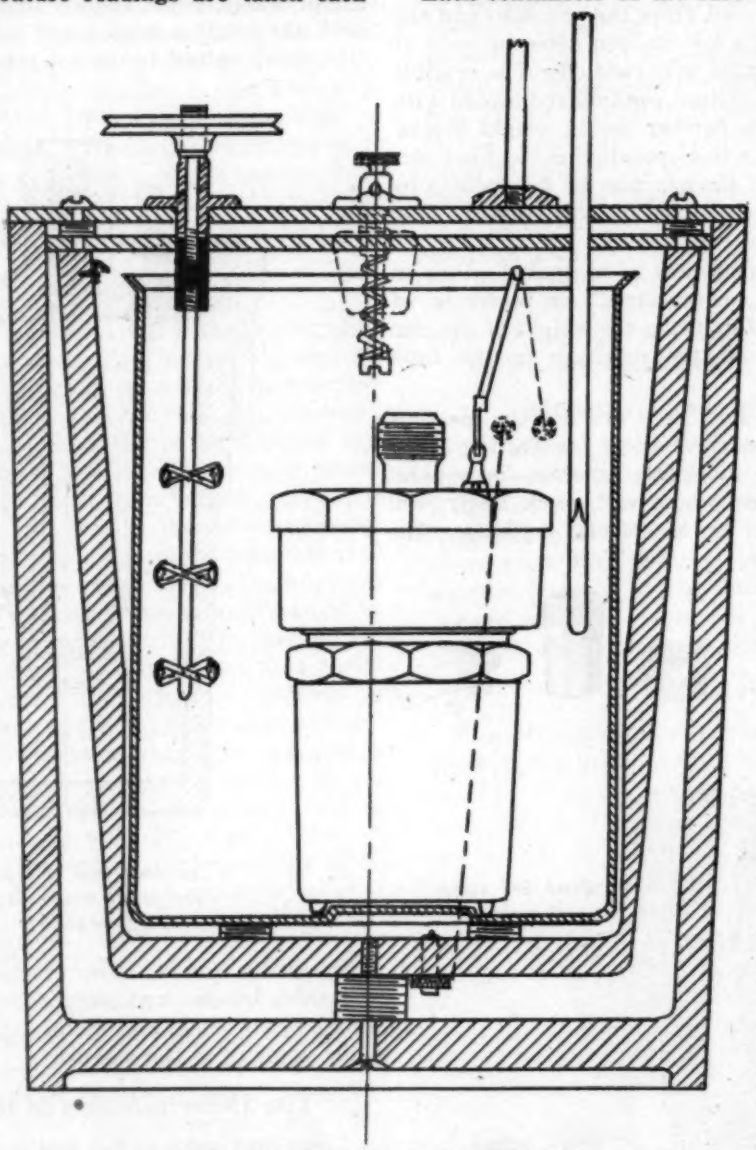
The radiation correction is then applied thus:

$(b - a) \times r_1 = t_1$ which is subtracted from the total observed rise in temperature.

$(c - b) \times r_2 = t_2$ which is added to the total observed rise.

The result so obtained is the increase in temperature corrected for radiation.

Each centimeter of the fuse wire consumed produces 4½ B. T. U. This must be subtracted from the total B. T. U. produced.



Sectional view Calorimeter ready for firing

The correction for the formation of the nitric and sulphuric acids is found by washing the bomb with distilled water and titrating the washings with a sodium carbonate solution made by dissolving 2.061 grams of pure sodium carbonate in a liter of water. Each cubic centimeter used is equivalent to 1 B. T. U., due to nitric acid. The sulphuric acid formed has produced heat units equal to 13 times the sulphur content expressed in per cent. These values should also be subtracted from the total.

To determine the heat equivalent of the calorimeter burn some standard substance of known heat value, such as benzoic acid, in the instrument. Add to the heat value of the substance used the heat due to the burning of the fuse wire and the heat due to the formation of the nitric acid. Divide the total heat value thus obtained by the rise in temperature corrected for radiation, and the result is the water equivalent of the instrument and the 2,000 c.c. of water used in it.

Coal analysis is the only method whereby you may keep informed as to the true heat value of your fuel so that your steam may be produced efficiently.

Notes on Dyes and Their Application to the Paper Industry

By H. G. BOONE
Kimberly-Clark Co.

THE subject of dyes is one in which every paper maker should be widely interested and is a subject regarding which both superintendents and mill men in general give very little attention. This has worked to their especial disadvantage during the last few years, due to the fact that, in the paper industry, as well as in every industry in which dyes are used, their importance has been so greatly magnified and distorted over usual manufacturing conditions, wherein standardized formulas could be worked out with the help of technical dye men and then rigidly adhered to. It is extremely unlikely, however, that pre-war conditions will be obtained for several years. Therefore, it is still important that every paper maker know as much as possible about dyes, their individual peculiarities, methods of determining comparative strength, etc. These notes will consist of a general consideration of the subject, followed by notes on the individual dyes themselves.

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There have been a large number of theories advanced as to what really takes place when a solution of a dye is put into the beater with the paper making fibers.

Theories on Dyeing

Among these may be mentioned four, no one of which, however, will explain all cases.

1. The dyes and fibers form a chemical combination.
2. The theory of adhesion.—In this the color settles on the surface of the fiber without penetration.
3. The osmotic theory by which the color solution diffuses through the fiber walls and is there rendered insoluble.
4. The electrical theory.

In dyeing paper pulp, we believe the combination of at least two of these principles as expressed above, assist in the fixing of the dye on the fiber. In the case of basic dyes on ligneous fibers the action is based on theories 1 and 3. In the dyeing of Cellulose with acid dyes, the action proceeds according to 2 and 3. In the dyeing of Cellulose with direct dyes, the action is according to 4, possibly assisted by 1.

Colloidal Nature of Dyes

Colloidal Chemistry also plays an important role in dyeing. An understanding of some of the principal factors involved will sometimes make for improvement of results and cheapening of process. Cellulose is a negatively charged colloid, that is, it exerts a tendency to attract and hold positively charged colloidal particles. To obtain the maximum coloring effect, the character of the charge of the material to be added whether plus or minus should be pre-determined, and if positive should be added before the Alum and if negative, after the Alum, as Alum carries the plus kind of charge and is absorbed with the fiber and is waiting, so to speak, for the dye particle.

Mottled Effect

The phenomenon of mottling is a trifle troublesome at times and is usually noticed when using basic dye solutions, due to the fact that they possess very great affinity for certain fibers. Thus the reaction proceeds with great speed. When looking at this problem from the colloidal chemistry standpoint a remedy can easily be devised. Dilution of the dye solution helps some, but a better way is to make the dye solution with clay in suspension in water before adding to the beater. China clay is a negatively charged colloid and absorbs certain dyes which carry positive charges, such as Bismarck brown, methylene blue, methyl violet, etc., those dyes which, in general, cause the most trouble. This combination can be dispersed throughout the entire pulp mass without danger of mottling and the combination is then destroyed by use of alum and the regular mechanism of dyeing proceeds without the mottling effect.

Nomenclature

The various names under which the same dye is frequently sold by different firms is often confusing. It is essential, in so far as possible, the various trade names are learned so that you will be able to recognize the same dye when it is sold under a different name. It is also quite important to become familiar with the letters and numbers following the name of the dye, which are used for indicating variations of shade for concentration of the main constituent. Thus R, 2R, etc., denotes increasing degrees of a red shade in a dye, such as a blue or a yellow. Similarly B, 2B, etc., denote varying degrees of blueness. The word conc. or the letter "x" denotes, as you would expect, varying concentrations.

Solubility

Most dyes dissolve easily in water, but some do not, and to play safe it is best to strain all solutions before adding to the beater through a fine wire screen to avoid specks in the sheet, due to undissolved dye stuff. If a source of soft water is at all available, it is advisable to use this rather than hard water, as most dyes are affected, both in regard to shade and strength when hard water is used. It is also necessary to have the water very hot when the dyes are added, except in a few cases, which will be pointed out later. Do not try to make the solutions too concentrated. Have the water hot, stir in the dye slowly and usually no trouble will result. The use of acetic acid, especially in the case of hard water and basic dyes, will be discussed under Basic Dyes.

Adulteration

Dyes are very frequently adulterated to a large extent. The most common materials are salt, sugar, dextrine and sometimes sodium sulphate or sodium carbonate. The last is used in dyes which are very sensitive to acids. As dyes are mostly organic compounds, they can be ignited and burned away and then examination of the ash is of value. If the adulterant is of an organic nature, however, this cannot be done and the dye must be removed by repeated extractions with suitable solvents. The most valuable information regarding a dye must be obtained, however, by actual determination of its dyeing strength in comparison to a standard. This can best be done by making up sample sheets of paper dyes with the same amount of both the standard and the unknown in a rather light shade, conveniently 2-10 of 1 per cent of dye on the weight of the fiber used. Both the unknown and the standard should be stirred for the same length of time and treated alike in every particular and the standard made up for every trial until the unknown matches the standard, using more

(*Continued on page* 135)

Reciprocating Engine Lubrication

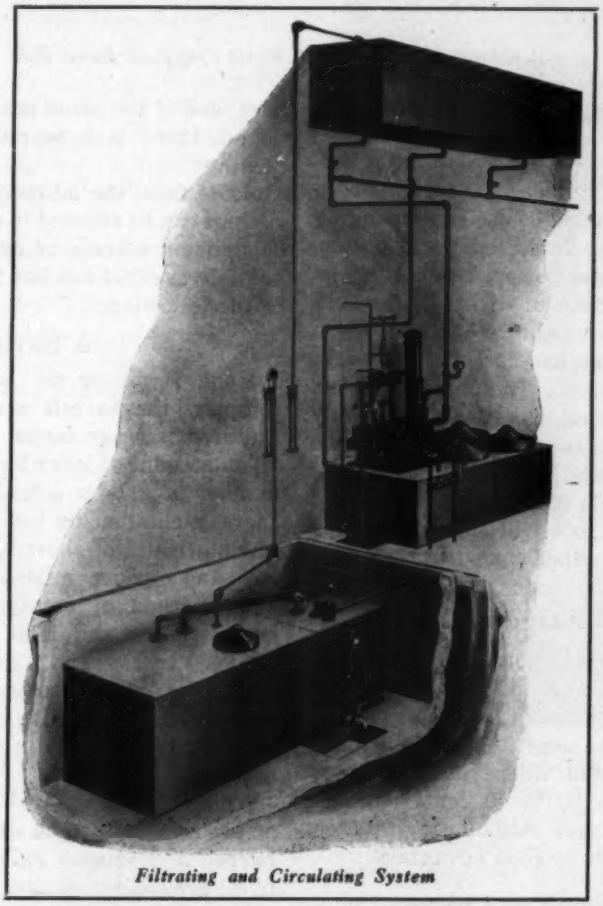
By C. H. DAVIES

LUBRICATION can be studied with profit by any industry, but especially is this true of the paper industry where the operating conditions vary so widely. In the paper mill we have heavy fast moving machinery, operating twenty-four hours a day. and six days in a week, with a variation in temperature ranging from 70° F. to over 200° F.; it is, therefore, essential that both the proper lubricant and lubricating method be adopted.

The object of lubrication is to diminish friction and conserve power by interposing a film of oil between the metal surfaces of the shaft and journal respectively, preventing them from coming in contact, which would result in heating and scoring of the journals.

This film need not be thick, as a very thin film will do the work just as well; any film, no matter how thin, will separate the metals and prevent friction, which, of course, is the only cause of heating.

The power generating units of a paper mill are as a rule reciprocating engines, although in the mills of later construction the steam turbine has been installed. I will confine myself in this article to the reciprocating type of engine. The force feed system of lubrication is preferable on this type engine, if for no other reason than the saving of coal, oil and labor.



Filtrating and Circulating System

Saving in Coal

In regard to efficiency, by referring to Kent it is seen that the friction of a bearing when oiled with an oil bath is from one-sixteenth to one-tenth of an engine oiled with ordinary methods and oil cups. The journal friction of an engine varies from 5% to 7½% of the indicated horse power under the hand and oil cup system of lubrication. Taking one-sixth to one-tenth of this figure, it gives a saving in favor of the force feed lubrication of from 4% to 6%. What this saving actually represents can be illustrated by taking an engine of the type under consideration as an example.

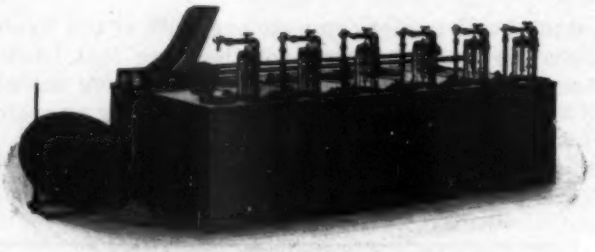
We will assume that this engine is of 600 horse power and averages ten hours per day, 300 days per year, the operating efficiency of which is 20 pounds of steam per horse power per hour, and the water evaporated to produce the steam at 8 pounds to one pound of coal; 600x20x10x300—36,000,000 pounds of steam used per year. Divide this number by the number of pounds of water per pounds of coal, we get 4,500,000 pounds of coal or 2,250 tons. From our previous statement, that there would be a saving of from 4% to 6%, it will show that 4% of 2,250 tons is 90 tons. Supposing coal costs $1.25 a ton—this would be a saving for the year of $112.50. (This saving may be either more or less, depending upon the price of coal.)

Saving in Repairs and Shutdowns

It is stated by good authority that a bearing will last ten times longer with stream feed than with scant lubrication. Every power plant engineer recognizes the fact that bearings have to be keyed up and lined occasionally to keep them from pounding. A very common method of determining in which bearing an engine is pounding is to flood that bearing with oil. If the pounding ceases they have located the bearing that was pounding. If the oil has no effect on the running of the engine, they will go to another bearing and repeat the same performance. This, in itself, shows that with stream lubrication the bearings will not pound as freely as they will with scant lubrication, and

consequently will not need to be keyed up so tight and there will be no danger of heating. This saving will be particularly noted in big mills with large bearings exposed to the dust and dirt which these bearings usually have to stand.

A shut-down to any factory for any length of time is quite a loss, and the savings from one shut-down may more than pay for the cost of stream lubrication, as, for instance, a factory employing two hundred men will shut down thirty minutes on account of a hot bearing,—this represents one man's time for twelve and one-half working days of eight hours each.



Battery for Lubricating Oil Track, Barrel Cradle and Barrel Dash

Wastage

The amount of oil that should be used on an engine is approximately 2% of the indicated horse power, or, in this case of 600 horse power, twelve gallons per month should be the amount of oil that would have to be replaced. We have known of cases where the engineer has claimed he has cut his oil bills in two by using the stream feed. The amount of this waste on an engine is governed entirely by the care taken in guarding the engine. If the least bit of oil is not caught by the guards this amount of oil is wasted and will be soaked up by the floor or wiped up with a piece of waste.

5 Gal. Quick Return Pump

Cheaper Oil

With a large amount of oil running over the bearings of an engine, it is natural to assume that a cheaper grade of oil could be used. This has actually been done, and where they had been paying from 30 to 40 cents a gallon for oil, they have used oil ranging from 25 to 30 cents to good advantage.

Saving in Labor

With steam feed the saving in labor can be reduced very materially. Most plants have a chief engineer and oilers to take care of the oiling of the engine, wiping same, and other odds and ends to be attended to around a plant. With stream feed the oiler can be dispensed with and other arrangements made for cleaning the engines and such work as the oiler has been doing. Even with the stream feed, the engineer's duties will be reduced to such an extent that his time may be used to good advantage in looking after some other work. If one man's time on the system outlined could be saved for this company, it would approximate a saving of $750.00 a year.

Saving in Reconstruction

There are other small savings which can be enumerated, such as savings in foundations and worry. Any foundation soaked with oil is not as good as a good, clean foundation, and eventually will have to be replaced or repaired. This will first be noticed by the engine loosening on its foundation bolts. An engine pounding all the time is a source of annoyance, and if the same is keyed up so that it will not pound, there is a source of worry on account of heating.

Aside from the lubrication of the power plant, oil savings can be effected in other departments by using department storage of modern design. The savings possible to effect are but the items briefly mentioned in the following:

A Saving in Oil

Upon receiving the barrels of oil from the oil company the barrels are emptied by gravity into leakproof storage tanks, thereby eliminating loss of oil on account of leaky barrels; a tank gauge tells the number of gallons actually contained in the barrel, thereby eliminating loss of oil on account of short barrels and invoice mistakes. This method of emptying barrels with the help of cradle, track and dash drains the barrel absolutely, thereby eliminating the loss due to oil being left in the bottom of the barrel.

Lubricating Oil Filter for small requirements

There are 22 square feet of porous wood in the wood barrel, and several gallons of oil are soaked up and absorbed by the wood. A tank with steel walls will eliminate this loss. Where faucets are used to draw the oil, there will be leaking faucets and overrun measures and consequent loss of oil. A pump of proper construction should be installed to prevent leaks from faucet, so that the oil from an overrun measure or oil accidentally spilled will return automatically to storage.

Where jigger cans are used, grit and dirt will contaminate the oil and perhaps cause serious engine trouble; the tanks and pumps that are dirt,

(*Continued on page* 130)

The Ideal Power Plant for Paper Mills

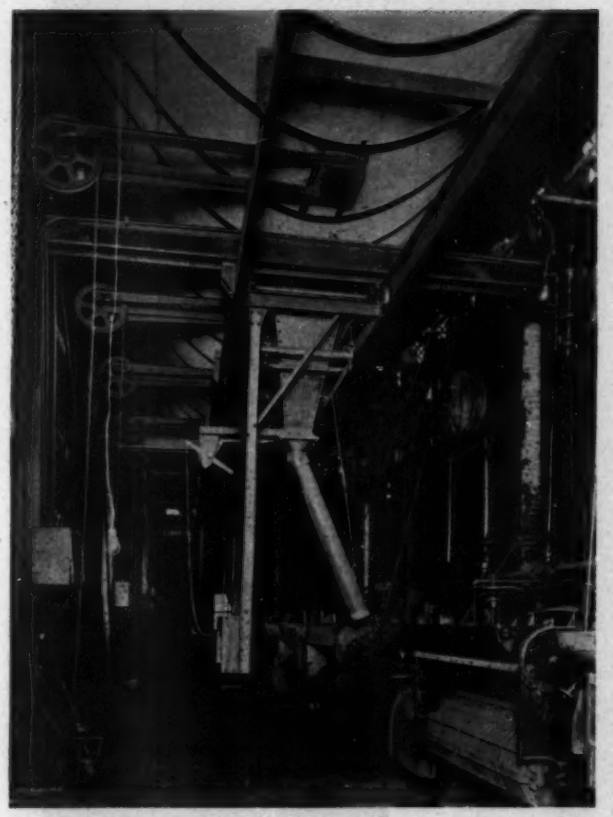
By JOSEPH HILL

[A common-sense article by a practical paper mill engineer, describing the requirements of the power plant from the knowledge that comes through years of actual experience.]

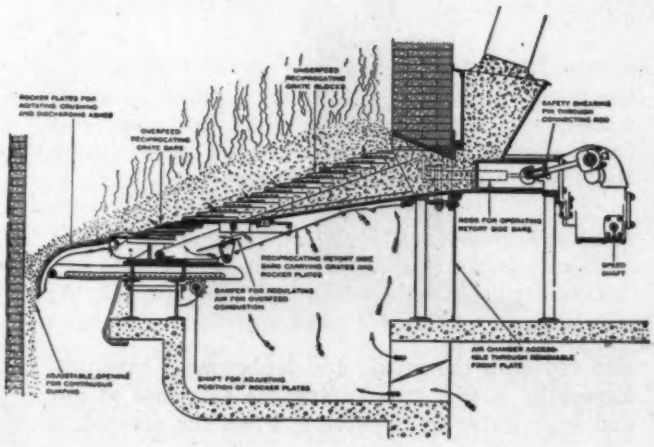
THE principal raw material used in the manufacture of paper is Power. It is used in large volume during every operation in paper making. This makes it very essential that it be produced as cheap and efficiently as possible, so as to secure economical production on a competitive basis. The comparatively small mill of one or two machines, situated at some distance from the sources of fuel and without waterpower, must depend upon efficiency in power production and application for their success.

Mills situated as in Wisconsin, for instance, will have to adopt the best possible boiler and engine room practices, developing and applying every ounce of energy in every pound of coal, so that it may be possible for them to overcome the handicap of 75 cents to $1.00 per ton of the mills more conveniently situated.

The power plant is the point where real economy of operation must begin by obtaining the greatest possible energy for labor and fuel consumed, allowing thereby the actual paper making operations to be conducted properly and with a fair margin of profit. The means to this end are: an efficient Power House organization under a competent engineer, the adoption of all proven labor-saving, control and recording devices in conjunction with economical application of the power generated to the work at hand.



Of course, the adoption of labor and power saving devices can be overdone, such as the installation of a $5,000 method for saving $150 a year, but if you take your engineer into your confidence and begin a campaign of careful investigation, you cannot go wrong. Should any doubt remain, you may call in some competent authority to pass upon any new device being considered for installation.

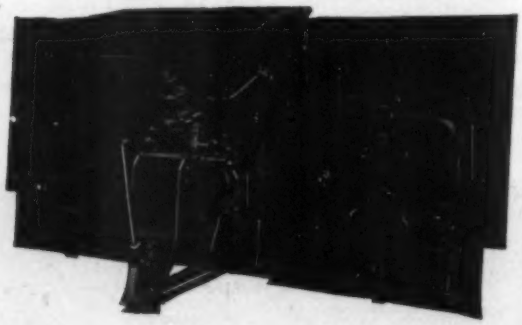


The new devices should not be adopted just because they are new, but only upon having it proved to you that they are economical in practice under conditions approximating your own.

The Power Plant Organization

After all has been said and done in the planning, designing and building of an efficient Power Plant, with all its labor-saving, recording and control devices, the most important operating feature is too little understood or entirely overlooked. I refer to the selection and training of the power plant

employees. The most essential factor in the production of efficient power economically is an intelligent power plant personnel; the ignoring of this factor will nullify all the improved labor-saving devices that you may adopt. It must, therefore, be



chosen with even greater care than in the selection of the apparatus, so as to secure a well-knit, perfectly balanced organization, capable of efficient and reliable operation of your equipment.

There are no hard and fast rules governing this selection except the application of sound commonsense, first in the hiring of the men, then inculcating them with your ideal thru fair and square dealing, with an ear always open to encourage their suggestions, explaining why the suggestion may be impractical in such a manner that you will leave the door wide open for any other suggestions they may have in the future.

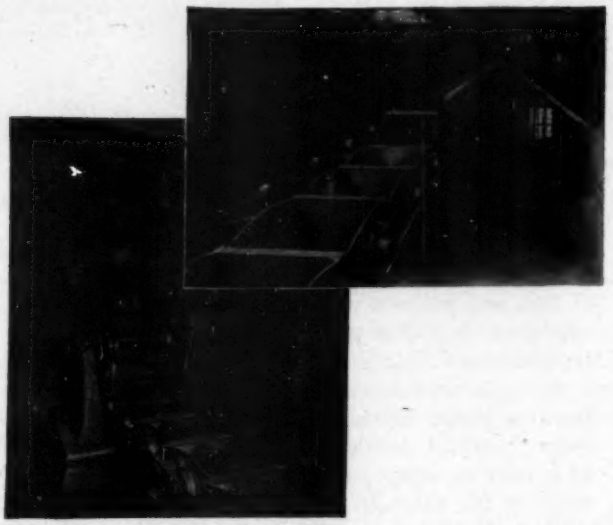
Fuel Analysis

The selection of proper fuel is next in order of importance. While this important matter has been in abeyance for some time, thru the pooling methods

of the fuel administration, the inconvenience has been a blessing in disguise, thru having done such wonderful missionary work among steam engineers, that it has converted the most skeptical to the necessity of fuel analysis and the buying of coal on specification or B T U units. Coal with too high sulphur content will ruin the boilers thru the SO_2 formed, which attacks the tubes at the temperature of combustion, so it should always be rejected as it is expensive at any price.

Handling of Coal

The handling of coal should be done entirely by conveyors and stored in close proximity to the fireroom, so as to facilitate its delivery by a combined delivery and weighing apparatus to the coal bunkers and mechanical stokers converting the fuel to heat

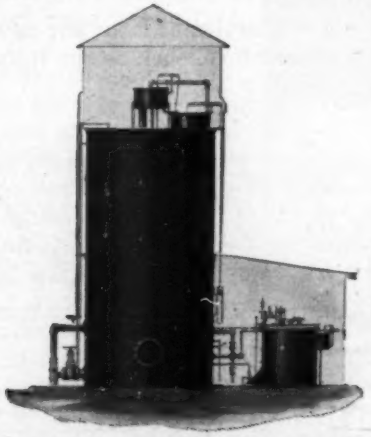


energy with least amount of labor compatible with greatest efficiency.

Recording instruments showing temperature and volume of uptake gases, CO_2 and draft with their control should be installed so as to give readings of results.

Water

A water softening and filtration plant for Boiler Feed Water is splendid economy. Thru keeping the boiler tubes clean and free from scale, it yields the maximum evaporation with minimum use of fuel,



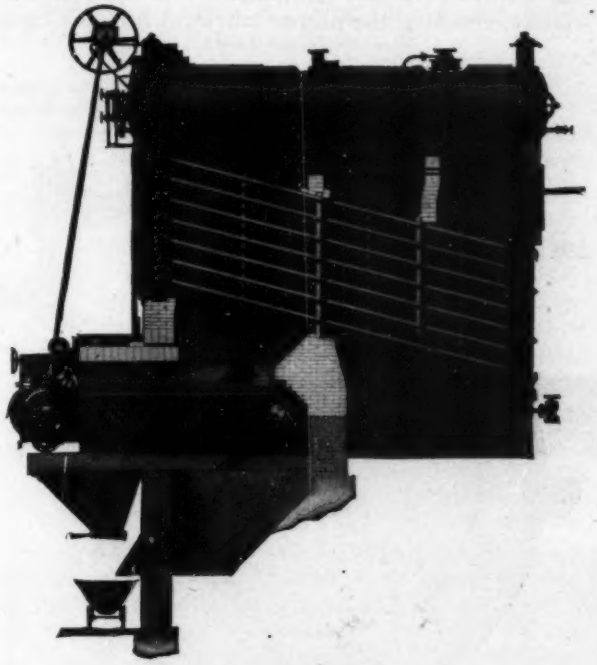
also reducing the repair and replacement expenses. Especially is this true during the extremes of low and high water in the rivers, when the amount of

suspended matter is greatly increased in all streams.

An economizer is a necessity to insure preheated boiler water with the waste heat, as this saves 1% coal for every 11 degrees rise in temperature.

Boilers

Boilers of the approved water tube type, with at least one unit over and above the maximum mill requirements, would give you the most flexible equipment with the best possible boiler insurance, besides saving you many a trying hour, as only with a spare

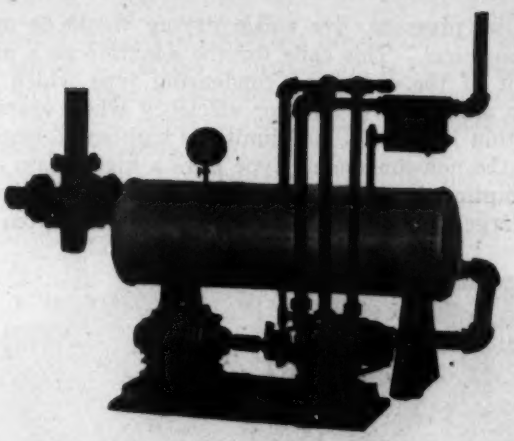


unit can you expect to reach real economy of operation. By judicious rotation in their use, you will be continuously operating clean boilers that have been cleaned properly and have been allowed to cool of their own accord, before being cleaned, producing better results with less expenditure for upkeep and replacement, giving you always 100% efficiency.

Pumps

A Simplex double acting pump with outside pack plungers, using a pump governor of the approved type, with relief valve in discharge to protect the pump; should all valves on boiler feed become closed at once and the pump cease operating, this relief valve would release the pressure.

The principal criticism of Boiler Feed Pumps is that they are of too light construction and as they are the principal essential to the boiler's security, great care should be exercised in the proper selection of type and style. The Boiler Feed Pump should be of 50 to 100% greater capacity than your outfit calls for, as it may be the cause at some future time of saving your entire boiler equipment. Be



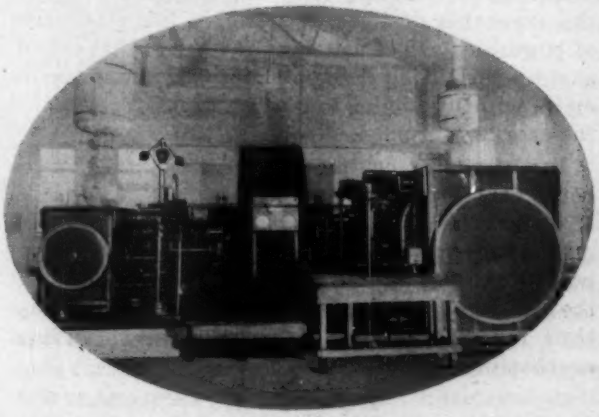
sure to avoid high piston speeds as they are very destructive to check valves and piping.

Driers

Steam can be wasted more rapidly in the drying of paper than by any other means. This can be overcome by having a sufficient number of driers to each machine to enable them to dry the heaviest weights at the lowest possible temperature. By so doing the engines of the variable speed type that are installed do not have to be such large units. When the pressure is 5 to 6 lbs. above atmosphere, smaller units can be used, than where the pressure is 15 to 30 lbs. This arrangement of 5 or 6 lbs. should be used in conjunction with a hydro-turbine pump, to take away the return from the driers and deliver it to the heater in the boiler-room, as the hydro-turbine pump is more simple than the reciprocating pump, causing less trouble with valves and piston packing, which troubles are bound to occur in the reciprocating type of pump. This, in my opinion, is the most ideal combination for extracting the water of condensation from the driers.

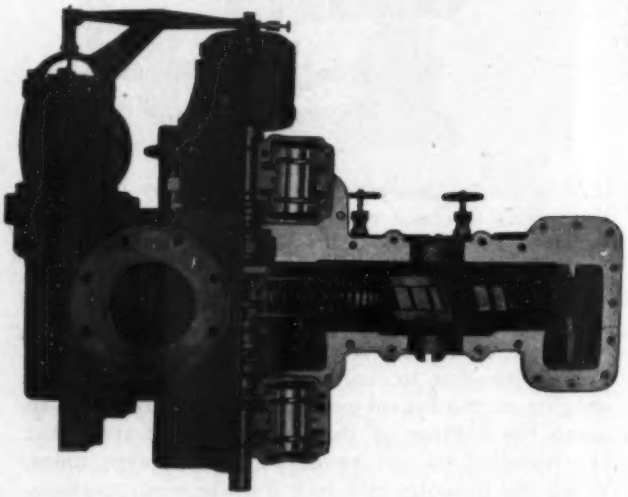
Type of Engine

The selection of the proper type of engine for a paper mill, where the exhaust steam can be used for



the drying of the paper or heating the mill, will be determined by the back pressure; in case of a 30 to

40 lb. pressure, live steam drying would be more economical. This calls for the adoption as a main unit of the compound condensing type which has the advantage of greater efficiency when operated within its normal load limits as high speed engines of the non-condensing type have a high steam consumption for power developed, but where there is a large amount of exhaust steam escaping from the



mills, due to the use of non-condensing type engines, a low pressure turbine should be installed, to save all the waste steam dissipated into the atmosphere, which represents a total loss in heat energy. By low pressure turbine, is not meant a strictly low pressure unit, so that should the exhaust be reduced to a certain point, live steam would have to be admitted into the exhaust line, to maintain the necessary back pressure, as this is another very wasteful method. But a combination of the high and low pressure turbine, with which should the exhaust steam be reduced to a point below the needed pressure for the low pressure compartment, live steam may be admitted directly to the high pressure wheel in the turbine, receiving the benefit due to the expansion of the live steam in the production of power, instead of wasting the force of that expansion by permitting it to enter into the low pressure main, without any heat or power being received for the energy consumed.

In the engine equipment, as in the case of the boiler room, real economy demands the installation of an auxiliary unit of from one-half to two-thirds maximum capacity, which can be used in case of partial shutdowns of the manufacturing units, at the same time insuring your main unit against abuse thru the strain of continuous operation without overhauling.

Lubrication

The choice of an efficient system of lubrication is very advantageous, as it prevents power loss from friction and at the same time keeps down the cost of upkeep and overhead thru the prevention of heating and scouring of the journals; experience points to the adoption of a force feed and returning oil system with proper application. For cylinder lubrication on engines of the Corliss type the steam valves should be tapped 4 in. from each end, as where only a single connection is used it is impossible to cover enough interior surface. The difficulties arising in the choice of lubricating oils for the various bearings and valves can only be overcome by the classification of the various types into two or more general classes, choosing the proper lubricant for each class

and the application of the lubricant in volume and interval commensurate with the speed and the amount of surface to be covered.

Power Application

The large amount of power required in paper manufacturing necessitates its most careful application to secure the most economical operation. After carefully scrutinizing all methods of application of power to a paper mill the electric drive recommends itself for adoption, due to its inherent reliability, flexibility, practical economy and high efficiency.

Continuous Service

In considering the adoption of electric drive for a new plant, or to supersede mechanical drive in an old one, the practical operator must be assured that he will thereby obtain uninterrupted service and a defi-

nite saving in the cost of production, either by a low installation expense, by increasing the percentage of the power developed which is actually applied in useful work, or by a reduction in operating expense.

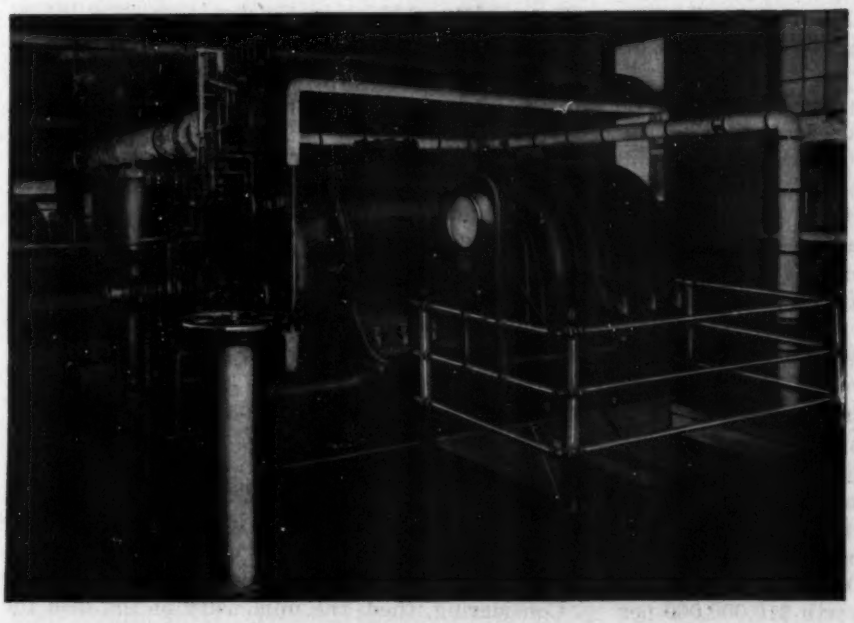
Direct Connected Units

The transformation from steam to electric power by the use of direct connected units with a synchronous condensor connected to the generator to absorb the overload will considerably reduce power cost thru the elimination or reduction of heavy shafting and belting, resulting in a neater equipment of a much lighter character.

Proper Allocation of Machinery

The machinery can be located with a view to the elimination of all unnecessary handling of the product, as each machine or group of machines can be supplied with its own motor and operated as an independent unit. The average motor used for driving paper mill machinery does not require special foundations, and as the adoption of motor drive eliminates a large percentage of long shafts and heavy hangers and belting, which are required for mechanical drive, their original cost and maintenance should be considered when comparing the initial expenditure required by the two systems.

The generating plant may be economically divided into two or more units, thus insuring against a complete shut-down in case of accident and permitting economical operation with individual sections of the plant.



The use of recording instruments on motors temporarily installed will permit various capacities to be tested in operation so that the exact size motor required for the most efficient operation of any machine or group can be accurately predetermined. This will enable any errors of installation to be corrected and will eliminate haphazard methods of ascertaining the power required for driving the machinery required for additions to the plant.

Electric drive has great flexibility, in that additions to an existing plant may be made without interfering with the operation of the original equipment.

Great economy in power can be obtained where individual motor drive is adopted, by the elimination or reduction of the friction loss involved in the operation of shafting, belts, gears, idlers and other consumers of energy. The power consumed by the different sections or different machines can be readily measured by connecting a recording instrument in the motor circuit and the graphic record will show at once whether or not the power consumed is normal, and this will frequently serve as an indication of the condition of the machinery and will insure a prompt detection of any defects. As the power can be conveniently measured, all machinery may be operated at such speeds as will produce the best results without unnecessary consumption of power.

Power is King in the paper industry. By its use or abuse will the paper manufacturer be able to overcome the evils of the impending economic crisis which will necessitate the closest economy in power production. This calls for the perfect co-operation of the entire paper mill organization in the proper and economical application of power to the work at hand, so as to enable the paper manufacturer to sell his product in a competitive market with a fair margin of profit.

The Value of Waste Paper Stock in the Manufacture of New Book Papers

By EDWARD T. A. COUGHLIN, B.S., CH. E.

(Continued from April Number)

A MORE general appreciation of the market value of rags, rope, and waste paper of all kinds would increase largely the supply of paper stock and add considerably to the income of the people. According to a recent estimate the value for paper making of the waste textiles of the country is greater than the value of the rye crop, one-twentieth that of the wheat crop, one-third of the total value of the products of the saddlery and harness industry, half as great as that of the fur goods industry. Rags to the value of $9,000,000 annually are now used for paper making and about three times this amount could probably be secured, which, at the same valuation, would distribute approximately $27,000,000 among the people; $7,000,000 worth of waste paper is used each year in paper making, but it is estimated that three times this amount can be saved, distributing $20,000,000 per year among the people. It is evident, therefore, that the value of these wastes annually destroyed is large and that if they were gathered their use would serve the double purpose of producing good paper and of conserving other materials.

More than 3,000,000 tons of paper are now made annually, according to an official report of 1907, in this country, of which fully 80% becomes waste in three or four years. Of this, about 25%, or 588,000 tons, is used again in the form of new paper cuttings and trimmings and old waste paper. Here also we estimate that fully 1,000,000 tons of raw material which would have made 900,000 tons of paper could be readily saved from waste at a cost for collecting that would permit its use, as most of it is to be found in the cities and towns in the form of old books, writing paper, news paper, wrapping, and pasteboard. The wholesale price of such paper ranges from $2 per hundred pounds for new high-grade cuttings to $1 for new white paper, and from 65 cents for folded news paper to twenty cents per hundred for common scrap paper of any kind. Valuing the waste paper at 0.5 cent per pound, the 1,000,000 tons of paper now wasted that could be saved is worth $10,000,000 per annum, and would make all the building, bagging, cover, blotting, and miscellaneous papers, and all the paper board now produced.

The great value in the recovery of waste papers is further realized by the following memorandum figured out by Mr. F. C. Clark, former paper expert attached to the Bureau of Standards of the United States Government, Washington, D. C. It is calculated on the assumption that it would be possible to collect and recover all the waste paper available in the United States.

Available per day, tons	13,000
Average price per ton	$12.00
Available for box boards, etc., tons	10,000
Available for print and writing paper	3,000
Loss on handling print paper	15%
Amount recovered on print paper, tons	2,550
Loss on handling box boards	5%
Amount recovered for box boards, tons	9,500
Costs to recover on prints, per ton	$23.00
Costs to manufacture into paper, per ton	25.00
Costs of paper, $12 plus 15% loss, per ton	13.80
Total cost per ton	$61.80
Average sale price per ton	85.00
Net profit per ton	$23.20
Net profit on 2,550 tons per day	$59,160.00
Per year	$17,748,000.00

And for making box boards the profit is even greater.

Box Boards:	
Cost of box board stock (plus 5% loss)	$12.60
Cost to recover	10.00
Cost to manufacture	5.00
Total costs	$27.60
Sale price	40.00
Profit per ton	12.40
Profit on 9,500 tons, per day	$117,800.00
Profit per year	$35,340,000.00
Profit on print and writing paper	35,340,000.00
Profit on boards	17,748,000.00
Total profit per year	$53,088,000.00

This is not a small item and it is said that the calculation is figured on a conservative basis.

Methods for De-inking Waste Papers

Considering, then, the immensity of the field for using old papers and at the same time reaping a considerable profit, it is only logical that many methods have been devised and patented to reclaim these waste papers.

It would be almsot impossible to try to collect all the different methods that have been patented, but I have a number of the more recent procedures which

I will give at some length in order to cover the field as closely as possible. Later the different processes that I have seen in practical use will be given in intimate detail. I have attempted to divide these preliminary methods under three headings: (a) Mechanical action alone without the use of any chemicals; (b) chemical action alone; (c) both actions combined.

Under mechanical action alone very few methods of any value whatsoever are to be found, for it is a recognized fact that to produce pulp for book paper the inks must be entirely removed to get a good white color. The inks mostly consist of some pigment combined with an oil or varnish body known as a vehicle. To remove the ink it is a case of saponification and an alkali of some kind is necessary to combine with the vehicle. However, under mechanical action alone may be classed all the methods in use in the roofing and board mills which use entirely old newspapers. For this grade the color is of secondary importance and the product is usually heavily colored with loading ochres and red oxides. Nevertheless, there is one method which is largely mechanical in action, the Winestock process, the details of which will be covered later. It is safe to say that there are no methods of commercial value for the mechanical removal of ink from waste papers to produce pulp to be made into new book paper.

For treatment of papers by chemical action alone is understood processes carried out where the papers remain stationary, allowing the liquor used to circulate and permeate thoroly. In this way the ink is broken up, being deprived of its vehicle, and is easily washed out subsequently in the washing engines. This method is considered to be the practical outcome of the earliest experiments in treating papers. This method is called the "open tank cooking" process and is still largely in vogue in the middle western mills.

Ryan Process

The first description of this process is ascribed to Mr. J. T. Ryan, of Ohio, and was patented by him. In describing it he says: "The waste paper is first passed thru a duster in the usual way, all thick old books being previously torn apart to separate the leaves. The papers are then boiled in a hot alkaline liquor without pulping them, whereby the alkali acts on the surfaces of the papers, and dissolves off, carrying away all the ink into the liquor. The papers, which are still in sheet form, are then drained as free as convenient from the alkaline liquor, and are next washed in the washing engine, which leaves the material perfectly clean. It is then pulped in the beating engine and it is able to produce a first-class paper without the addition of any new or expensive paper stock. The details of the process are thus given by the patentee: "Into a bucking kier put a soda ash solution having a density of 5° Beaume at 160° F., put in the stock, and shower for eight hours at a temperature of 160° F., without pulping the paper; then lift and drain well, and cleanse and bleach in the washing engine; then pulp and form into paper. As the draining will always be imperfect, each charge removed will carry away some of the soda ash solution, and leave the remainder of impaired strength. After each drainage add water enough to make up for loss in quantity of the solution at a density of 13° B. to bring all the liquor up to 5° B. at 160° F. In about eighteen working days the liquor will have accumulated considerable ink and other matter. Then blow one-half of the liquor and restore the quantity for proper working. None of the soda ash solution is wasted, except as fails to drain and what is blown out as last mentioned. In carrying out this process every care must be taken to guard against pulping before the alkali is washed out."

Bell and Lape's Process

A new and novel method of treating papers is provided in a patent taken out by Horace M. Bell and Edmund R. Lape, of Swanton, Vermont.

"The inventors of the new process say they have found that in the well-known methods now employed in removing the ink from the old paper stock, it is customary to beat the stock into a pulpy mass while being treated with the ink-removing agent. This method, while effecting the separation of a very large percentage of the ink from the paper, causes quite a large proportion of the carbon particles of the ink, which are in suspension in the liquid, to be worked into the fibers so that the latter are thoroly impregnated with the coloring matter. After the ink has been worked into the fibers in this manner it is impossible to effect its removal, and this condition is responsible for the discoloration of the pulp from old paper stock.

One of the objects of the present method is to so treat the waste paper stock as to thoroly remove the ink and coloring matter therefrom and to prevent it from being embedded in the paper pulp, whereby a pure white paper pulp may be produced; another is to so treat the waste paper stock as to effectually remove the ink and other coloring matter therefrom with practically no loss of stock.

In the practice of this method, the inventors say, the waste paper stock is first cleansed or dusted in any suitable or preferred manner, and then torn or cut by any suitable means into small pieces or sheets. The size of the pieces is immaterial except that they must not be so small as to be destroyed in the next step of the process. The stock after being torn or cut is then placed in a suitable receptacle and subjected to the action of a soap solution made from any preferred soap. The strength of the soap solution may vary and the inventors do not limit themselves to any fixed proportion of the ingredients thereof. They have obtained excellent results, how-

ever, by employing one part of soap to 600 parts of water to ten parts of the paper stock.

The ink may be removed by the use of either hot, cold, or boiling water in the soap solution, and the present method contemplates the use of soap and water, irrespective of the temperature of the water, which may be varied to suit conditions. While in contact with the soap solution the small pieces of paper are agitated sufficiently to cause every part of the paper to come in contact with the solution, and also to cause the faces of the pieces to rub against the tank containing the same, thereby producing sufficient friction or attrition to assist the action of the soap solution in loosening the ink from the pieces of paper. Care must be taken, however, in the agitation of the paper, not to break up the pieces or to cause such an action as will tend to drive the ink particles into the paper fibers.

The object of the step thus described is to remove as much of the ink from the surface of the paper as possible without disintegration of the paper, and to cause the ink particles to remain suspended in the soap solution. As a result of this treatment, the printed matter is practically removed from the small sheets of paper, and the soap solution with the ink particles suspended therein may be drawn off and used again.

In the treatment of some classes of magazine paper it may be desirable to add a small percentage of a suitable alkali to the soap solution, altho this is not needed ordinarily.

After treatment with the soap, the material is washed until the stock has assumed a pure white shade. The stock is agitated during this washing so that the ink particles are floated away and care is taken not to break up the pieces of paper.

Obviously the above method would be impractical on a working scale without adjusting the procedure according to conditions. In point of fact it can be hardly called a chemical action either, because the ink is removed wholly by loosening and friction and floated away. Evidently the details were worked out in a laboratory and by persons not familiar with the present-day methods in treating papers.

Mention has been made of a recent patent for the use of borax as the alkali in removing the vehicles and colors of the inks and of the papers, but so far I have not been able to locate the exact details of this method. It is claimed that this material does not produce a discoloration of the fibers of the mechanical wood pulp as do the ordinary caustic alkalies. In this process the waste papers are boiled in a solution containing about two pounds of borax in 1,000 pounds of water.

By far the greatest number of proposed and actual methods depend on the combined chemical and mechanical treatment of papers. The most important process of this type is the rotary boiler process, the intimate details of which will also be taken up later, and also the cooking engine process.

A review of some of the patents on this type will perhaps reveal information of contemporary value.

The Herz Process

This process is described in detail in an issue of Wochenblatt fur Papierfabrikation (No. 34, August 22, 1914).

The process is the result of eight years of study and experiment by Mr. Herz. He is protected as to the lye mixture and the apparatus employed, patents being issued in 1910.

In addition to furnishing a cheap substitute for the woodpulp, rags, etc., which are steadily increasing in price as the supply becomes less plentiful, the Herz method is said to be exceedingly simple in manipulation, calls for no expensive apparatus, and can be accommodated in almost any paper mill.

The mechanical plant required for the production in eight working hours of 10,000 kilogrammes of washed material for pulp, consists of two beating engines of 100 to 150 kilogrammes (200 to 300 lbs.) capacity, one patent washing machine of about the same capacity, one stuff pump, or a slush machine. This outfit costs about $2,500.

The method of operation is described as follows: The beating engines are charged with old papers and by agitation with lye of soda and ammonia is reduced to pulp. Care must be taken that the fiber is not ground or destroyed by the rolls of the engines. The stuff, which has been disintegrated in this way, is let down into the patent washing machine underneath and washed with the help of fresh spraying water for ten to twelve minutes. Thereby printing ink, color, clay, and a portion of the shorter fibers are removed. The discharge is effected by means of a valve located in the bottom of the washing machine and operated from the outside. According to trials thus far made the loss of paper substance is from 18 to 25%, the average being 20%, using 800 to 1,100 gallons of water and about 30 h. p. to each 220 pounds of material.

In Germany the value of the process is computed as follows:

220 pounds of news	5 marks	$1.19
Less 20%	1 mark	.23
Consumption of lye	30 pfennigs	.07
Labor	30 pfennigs	.07
Interest, sinking fund, maintainance and steam	50 pfennigs	.12
Total	7 marks, 10 pfennigs	$1.68

Compared with this, new material would cost:

80% woodpulp at 11 marks	8.80 marks
20% cellulose at 20 marks	4.00 marks
Total, $3.04, or	12.80 marks

Attention is directed to the fact that the new pulp,

if used, had to pass through the beating processes, whereas the stuff made from old papers is all ready for the stuff chest.

It is also stated that the figures given are not based on wholesale prices and that if the old papers and lye were bought in large quantities a very considerable reduction in cost could be effected.

The Wangner Process

In the Chemiker Zeitung (about October, 1914) is described this process by the inventor, H. Wangner.

In the process, the yellowing of the mechanical wood fiber by the action of the alkali is prevented thru the use of a special bleaching soda, which contains about 3% sodium peroxide. The paper is fed dry into one end of a perforated steeping drum revolving slowly in a trough containing a 1% solution of this alkali, heated to a temperature depending on the class of paper under treatment, 30-40° C. for news paper. The interior of the drum is provided with helical passages and a special scoop removes a given quantity of the steeped material from the delivery end at each revolution. This material falls into a helical compressor which squeezes out the excess of lye to be pumped back to the steeping trough and delivers the paper as a cake to the pulping machine. The latter is arranged vertically and it contains a rotating bell provided with blunt teeth. The material travels down between the bell and the outer mantle, and then rises up inside the bell till it reaches the top of the stationary central cylinder. By that time it is completely pulped thru the action of the teeth, and it is washed down the central tube by a large quantity of backwater from the washing process, the dilution being assisted by stirring vanes on the shaft. The fluid stuff is collected in a chest, then passed over sand tables, then through a screen, from which it flows onto an endless wire sieve which receives a vertical shaking motion, imparted by ribs on the guide rolls which are driven at high speed. The fine particles of carbon, clay, and fiber debris are washed thru the sieve by means of spray pipes arranged above the traveling wire, so that the stuff is delivered at the other end perfectly washed and practically free from color. Provision is made for the systematic re-utilization of the cleaner backwaters. The loss of stuff amounts to 20-30%.

The Burby Process

This process was patented in the United States in 1914 by John M. Burby, of Astoria, L. I., N. Y., and is fully described in U. S. Letters Patent No. 1,112,887. The following is an abstract of his specifications:

"In the processes for the recovery of pulp from printed waste papers, described in the literature and letters patent relating to the art, solvents are employed to dissolve or saponify the oily constituents of the printers' ink, and in some of them directions are given to boil such waste papers in the stated solvents, or to subject them to the action of such solvents heated by steam under pressure, to reduce or destroy the adhesity of the ink, sizing, etc., to facilitate the separating of the pulp fibers therefrom. The grades of paper, known collectively as print or 'newsprint papers' and some grades of 'book papers,' are made partly—some of them largely—of mechanical pulp. This pulp differs from chemical pulps in that it still retains the nature of raw wood. When waste papers, made partly of this mechanical pulp, are subjected to the action of such, or as strong solvents as are to be used in the processes heretofore known, or of such solvents heated, or under pressure of steam, the raw wood fibers are discolored. This discoloration is very similar to that produced by exposing such papers to strong sunlight and cannot be obliterated, because the fibers of mechanical wood pulp are detrimentally affected by bleaching, and liable to be rendered thereby wholly unfit to be used again, except probably as filler.

"The more concentrated, or the hotter the solvent is employed, the more intensive is its discoloring effect, and the larger the proportion of the mechanical wood pulp is contained in the papers, the more pronounced is the discoloring effect produced upon all the pulp produced. The fibers of the so-called 'chemical' pulp are not so discolored by these solvents, or by subjecting them to the action of such solvents in a highly heated state, but as it is not practically feasible to separate the fibres of this chemical pulp from those of the mechanical pulp, the processes heretofore known cannot be employed in the recovery of pulp from waste papers containing a percentage of the mechanical wood pulp, because the pulp thus recovered is reduced in quality to such an extent that it is no longer suitable for the manufacture of the same grade of paper for which it was originally used.

"The object of this invention is to devise a process to recover also the fibers of this mechanical pulp, without their being discolored or their suitability for use in the manufacture of the same grade of paper otherwise impaired.

"Alkalis are most suitable for use as solvents in processes for the recovery of pulp from printed waste papers, but if used in solutions containing more than the equivalent of two parts of caustic soda to one thousand parts of water, or if weaker solutions are employed at a temperature of about 150° F., or more, they produce the explained discoloring effect upon the mechanical wood pulp which may be contained in such waste papers. Mr. Burby found, by an extended course of experiments, that a solution of one, or even less than one, part of caustic soda, measured by weight, in one thousand parts of water, if employed in proportionate quantities, is, in most instances, sufficient to so diminish the adhesity of the oily medium of printers' ink. (To be continued)

The Fundamentals of a Paper Mill Cost System

By S. L. BUSH

IN presenting the manner in which we handle our costs, I want to first say to you that the exact method we use in our work is not necessarily the method which you should use, as the refinements developed in this system were to meet our own particular requirements.

A mill having but one line of product can have a simple cost system, built on just as good, uptodate principles as the large mill having a variety of products, so in reading this article, please remember that, while the fundamentals underlying the Cost System are the same in every mill, the methods of application must meet the conditions as they exist in each individual mill.

The fundamentals which are the underlying foundation upon which any Cost System must be based are as follows:

Unit or Job Cost, Departmentalization, Direct Charging of Material, Productive Hour Method, Normal Cost thru the Budget System, and Double Entry Control.

Unit or Job Cost

A cost is figured on every unit of product, so that we may be able to determine what is our selling price, by the unit of job cost—I mean the cost of each different kind of paper manufactured in your mill.

The unit may be large or small, according to the conditions prevailing at your mill and the kind of paper run, as in the case of a mill manufacturing one line of product it would have a large unit, while the mill manufacturing a variety of papers would have small units. It is also absolutely essential that the cost of each individual unit may be obtained entirely separate from any other.

Departmentalization

Each distinct manufacturing operation is handled as a separate department so as to divide the cost of the product as it goes thru the plant and each individual department must have its own separate charge against the product which goes thru that department.

The number of departments will vary according to the character and number of products manufactured by the individual mill. A mill having one line of product perhaps will have only one department, while another mill having a large and varied number of products will have a large number of departments.

The product that goes thru two departments should stand the cost of those two departments only, while the product going thru three or four departments will have the cost of those departments applied. If one grade of paper goes thru one finishing operation and another grade thru two finishing operations it should be made possible in the cost system that each have its proper charge applied against it as no averaging will ever give satisfactory results.

Direct Charging of Material

Raw and prepared materials are located directly against each unit of product at the purchase or cost value as it is at this point where many inconsistencies have crept into the selling price by calculating or estimating the various materials on a percentage basis.

Taking, for example, a paper whose formula calls for 80% of a high grade pulp and 20% of a lower grade, but when the actual figures are compiled it will be found that it has taken 90% of the higher price material and 10% of the lower.

This condition arises in every mill as it is an axiom with the average beater man that when there is anything wrong with the paper he must add more of the higher priced material as this has been part of his training and an almost universal custom.

A percentage according to your formula and the percentage that actually goes into your paper mean something entirely different, and to get the real cost of your product you must have the actual amount of material used charged direct to each lot or unit as it is passed thru the beaters.

Productive Hour Method

In the department costs are two items, Burden and Labor.

Burden, or as it is otherwise known overhead charges, should be very carefully arrived at and applied to each individual department upon the basis of the Machine Productive Hour, so that the product will be charged only with the burden of the departments it has been thru.

The Labor item should be arrived at, distributed and charged on a Productive Hour Basis also, as it is only by this method that correct labor costs for a given product can be arrived at.

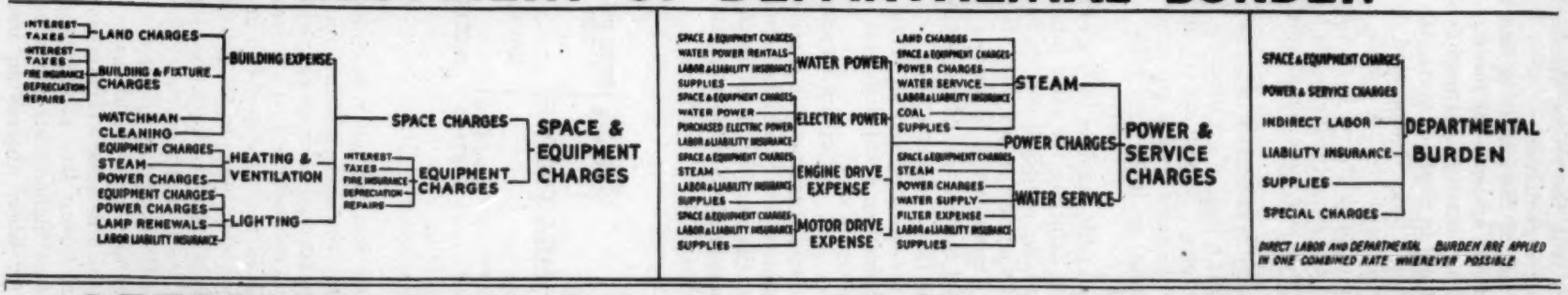
Normal Cost Through the Budget System

Departmental rates are based upon normal operating time and predetermined average expenditure

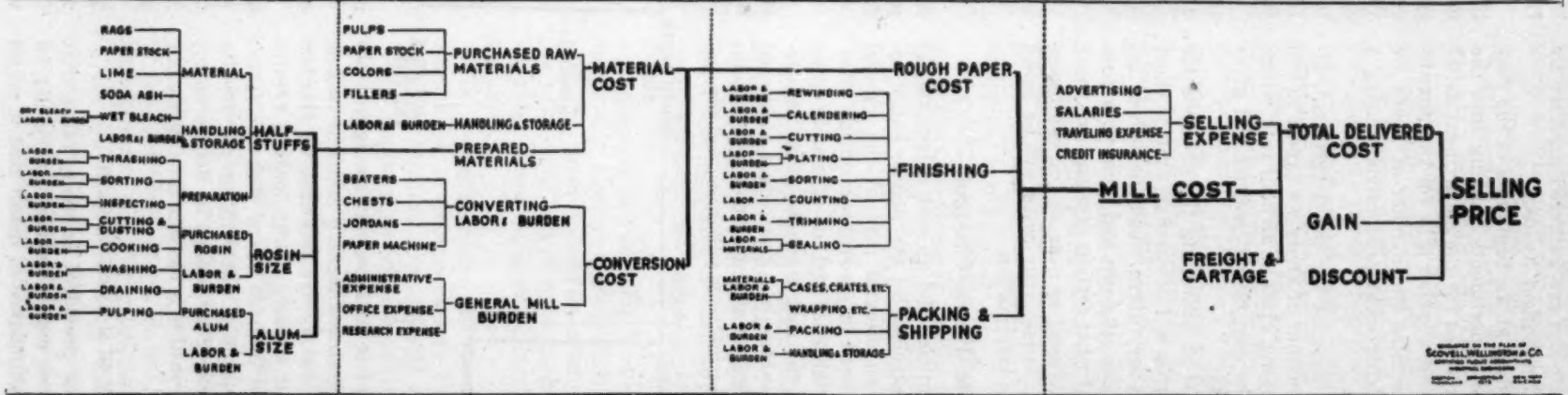
CHEMICAL PAPER MFG. CO.
HOLYOKE, MASS.

FOR MAY, 1919

DEVELOPMENT OF DEPARTMENTAL BURDEN



DETERMINATION OF MILL COST & SELLING PRICE



UNITS USED IN APPLYING CHARGES

SPACE AND EQUIPMENT CHARGES

BUILDING EXPENSE	CUBIC FEET EFFECTIVE SPACE
HEATING	SQUARE FEET RADIATION
VENTILATION	CUBIC FEET VENTILATION
LIGHTING	K. W. H.

POWER AND SERVICE CHARGES

WATER POWER	H. P. H.
ELECTRIC POWER	K. W. H.
ENGINE DRIVE EXPENSE	H. P. H.
MOTOR DRIVE EXPENSE	VALUATION AND NUMBER OF MOTORS
STEAM	POUNDS
WATER SERVICE	GALLONS

BURDEN CHARGES

HANDLING & STORAGE (RAW MATERIAL)	PER POUND MATERIAL
MATERIAL PREPARATION	
WET BLEACH	" " DRY BLEACH
THRASHING	" MACHINE HOUR
SORTING	" MAN HOUR
INSPECTING	" " "
CUTTING & DUSTING	" MACHINE HOUR
COOKING	" BLEACH
WASHING	" MACHINE HOUR
DRAINING	" POUND HALF STOCK
PULPING	" MACHINE HOUR
ROSIN SIZE	" POUND DRY ROSIN
ALUM SIZE	" " ALUM
TOP SIZE	" " RAW MATERIAL
CONVERTING	PER MACHINE HOUR
FINISHING	
REWINDING	" " "
CALENDERING	" " "
CUTTING	" " "
PLATING	" TABLE "
SORTING	" MAN "
TRIMMING	" MACHINE "
PACKING & SHIPPING	
CASES, CRATES	" BOARD FOOT
PACKING	" MAN HOUR
HANDLING & STORAGE	" POUND PRODUCT.

of a Productive Hour and are gathered together by what may be called a Budget System.

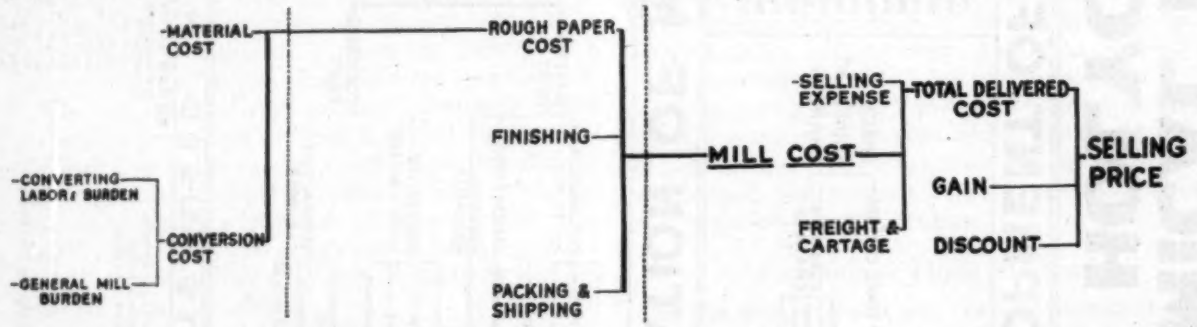
We make up a budget at the beginning of the year for each one of our departments, putting into the budget all of the expenses for the department as we can see into the future, whether it be for two months or a year, and determine the number of hours we expect to run the department productively during a normal year.

The total budget expense for the department, divided by the total number of hours we expect to run under normal conditions, gives us an hour rate, which we apply against the cost of our product and gives very accurate results.

Under the method of averaging the previous six months, you may bring in full running time or short running time and your future would be valued accordingly, while if you sit down and from your past experience figure out what certain expenses are going to be for each department as near as you can figure them for months to come, your costs will be based upon some uptodate information.

Double Entry Control

All material quantities and all cost values should be checked and controlled by the double entry accounts, which are an integral part of the general accounting system used in general accounting practice. It is immaterial what method of double entry control you use, as the cost accounts might be carried in the general ledger, in a cost ledger connected with the general ledger or any other convenient manner, as any one of the methods will give good results.



The real essential is to have all the figures obtained by the cost system check up with the ledger, as, while we know that figures don't lie, we also are sure there are some awfully funny looking results sometimes when we compare them with the facts; so if we have no means of checking up our results with the general ledger by means of double entry, we can never know until it is too late how funny our figures may appear.

The Why of a Cost System

The idea has been prevalent in many cases that to have a cost system means having a large clerical force and such an abundance of detail that it would interfere with the proper functioning of the manufacturing organization.

The fact of the matter is that a seemingly complicated cost system—for instance, the one we have devised for ourselves, has been developed with all its refinements to meet our particular conditions, which consist of a large, complicated mill having a large variety of products. A simple, small mill, having one line of product, can have a simple cost system, built on the same fundamentals that would function for them as our more complicated system functions for us.

A large organization will need a large clerical force, and a smaller organization does not need such a large force. No mill can set up its cost system on exactly the same lines as any other mill and have the best thing, as in no two mills are the conditions identical.

But all mills can have their cost system built upon the same principle, the same fundamentals, and still not have the complications we have, if their conditions of manufacture are more simple and their products are more limited in number.

A Cost System should be adopted by every paper mill for three reasons: For establishing a selling price; for checking and encouraging efficiency; and for determining profit and loss.

Selling Prices

In determining our selling price, we use the time and quantity results obtained from our cost system, namely, the number of hours in each department, the quantity of materials used, the number of pound per hour that the paper machine can produce, and we apply the current values on the raw materials and the current rates on the departmental expense.

We do not look back on our records, and pick up a cost which was developed two or three months ago when we wish to quote our price. We take the statistical information developed by our cost system in regard to quantity of material and Machine Productive Hours and apply current values.

There have been conditions in the paper industry where the orders have been taken on a rising market without taking into consideration such important factors as higher costs for material and increased wage for labor, whereas an order taken today for

next month's manufacture should be carefully figured on the future costs of labor and material, so that the proper selling price for next month may be determined by the application of the fundamentals.

Efficiency

Determining efficiency is a very important function of a cost system, as its intelligent application with this purpose in view will pay for the system many times over, thru increased information in regard to their sales policies and increased production.

There is no paper mill in the country that is really efficient if any man in the manufacturing or selling organization does not have to report on what he is doing, as it is human nature for a man to be more careless about what he does of his own volition than when he has to give an account or report on his efforts. If he has to report he will always have something worth while to report.

We believe that this principle all through the organization will produce a much more efficient force and give us information which will aid in making changes in our methods and processes, which will save us a great deal more money than is spent in getting the records.

Profit and Loss

One of the most important advantages of our cost system is to have the figures presented every four weeks in just as complete and in a more correct manner than the old-fashioned asset and liability statements at the end of the fiscal year. We feel that it is absolutely essential for us to know where we are at every four weeks and I know of no other way to get this information accurately and regularly without having the figures compiled on the basis of good cost system principles.

The Graphic Chart

The first thing I want to bring to your attention on this chart is "Selling Price," a phrase that has caused some commotion in the Paper Industry for about six months past and has caused some very serious moments. I am going to try and show you how the selling price should be built up because if you want to make the right selling price you must know what the selling price is.

Discount

The selling price consists of three items, the discount, the gain, and the total delivered cost.

The discount you allow your customers when they pay their bills must be in the selling price to enable you to allow it to them. The net selling price, not the price on the invoice is what goes into your pocket, and what goes into your pocket is the only price your stockholders are benefited by.

Gain

The second item in the selling price is gain, a word which has more possibilities in it for failure or success of an industry than any other in our language and is much more important than cost itself.

We ask the people who buy our paper to give us "Gain" according to the service we render them, and not a percentage based upon the materials used to manufacture the paper, and is therefore fair and just to both ourselves and our customers.

Our method of arriving at a satisfactory charge for "Gain" or services rendered is based, as are all other charges, on the most important process in the paper mill, the converting of the paper on the paper machine. We figure the amount of productive machine hours against the product and then apply our gain per machine hour. We therefore measure our gain according to the service we have rendered, which is most correctly measured by the one operation which determines the general efficiency of our mill.

Total Delivered Cost

To the selling expense is charged all advertising salaries for sales force, traveling expenses and credit insurance, and is the expense accrued in merchandising our product.

The freight and cartage include all the items that occur from the time our product leaves the mill until it is delivered to our customer, and include the charges for transportation, handling while in transit, cartage and storage.

Mill Cost

The mill cost is the largest item in the total delivered cost and includes all the manufacturing charges, plus the burden charge, based upon the machine hour and divided into three classes of operations, packing and shipping, finishing and rough paper cost.

To packing and shipping is charged the materials, Labor and Burden consumed in all the operations that the paper undergoes after leaving the finishing room until it is shipped, such as casing, crating, bundling, wrapping, packing, handling and storing at the mill.

The finishing room charges are the Labor and Burden for rewinding, calendering, cutting, plating, sorting, counting, trimming and sealing.

The rough paper costs consist of the charges for the raw material used and the Labor and Burden expended in the various conversion operations such as beating, bleaching, etc.

Cost System Association

The small chart is the kind of a cost system that is needed in a great number of mills, nothing more. Any paper mills wishing to install this system but do not know how to get it, can call upon the Cost Association of the Paper Industry, as that is what it was organized for. They will have the kind of system best fitted to their needs and they will not have to devote all their time to it nor hire as many clerks as they have paper makers.

The Right Way to Keep Store in a Paper Mill

By G. M. HAFENBRACK

IF you had a retail store in your town that was doing a business of $40,000 and up a month, you would say that it was doing a good volume of business; and a concern that was doing such a considerable business would be expected to have a good bookkeeping system, which enabled them to say how much had been received and that when goods are delivered to a customer, the proper charge and credit is given. And yet, the stores in paper mills hand out materials valued at that amount and more or less ac-

cording to size, often with inadequate systems for keeping track of the charges.

The system in use at Port Edwards in the Nekoosa-Edwards Paper Co. seems so simple and yet so complete that a description of the store and the systems used may be of interest to other paper and pulp manufacturers.

Disadvantages of Previous Methods

For years and years the company has carried an account on their books known as "store account," and each month the total purchases of store material were charged to the store, and all materials which the store gave out were credited to the store account. At the end of the year an inventory was taken of the material on hand, and priced according to the invoices of the past year, and the inventory figure showed a loss or gain on the account carried for store on the books. There was invariably a considerable discrepancy because of materials that had not been charged though used. Often material was received and used at once, which the store would be charged for, and yet had not on hand, and of course would not be accounted for at the annual inventory. The store was so situated that it could be entered at several places, and men who needed material helped themselves, and the proper charge was not made. All this was changed when the present store was arranged.

It is the purpose of the store to keep on hand such articles as bolts, cap screws, set screws, pipe fittings, electrical materials, felts, wires and such material as is used daily in a paper mill for general repairs and the running of the mills. The total value of such material runs into a large sum of money, and time and thought spent in seeing that proper account is made of store material, pay big dividends.

Superintendent's Requisitions

When a superintendent decides on a repair and needs something which is not carried in the store ordinarily, he fills out the superintendent's requisition, a copy of which is a card which remains in the superintendent's file, and three copies go to the store. The purchasing agent gets one of these pinned to the storekeeper's requisition, and one of the other two is held until the goods are received, when the slip is returned to notify the superintendent that the material he has requested has come. The third copy is kept on the file for reference should it be needed.

Receiving Stock

When the goods arrive, the receiving clerk notes what has come on the form shown as "merchandise received." This form has spaces for all the notations needed for the storekeeper to make his entries, and to assist him in checking invoices and weights. The receiving clerk also attaches a "store stock tag" to material and this is very helpful in preventing the loss of material. Such items as motors, large valves and special items are labeled at the time received, and no matter how long they remain in the store before

being used, the record is right before one as to what the article was ordered for.

Perpetual Inventory

When an invoice for material is received, it is entered on a "store stock card." When the material is received that is noted in the first column on this card;

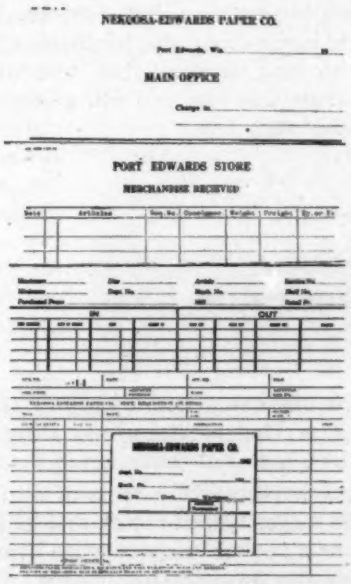
one half of the card is for receiving and the balance for delivered goods. This affords a perpetual inventory which enables the storekeeper to automatically order another shipment when the supply gets below the "danger" of low-water mark.

Store Room Charges

It has been the practice of the storekeeper to charge the material in at cost, and to charge it out at 10% above cost, and the 10% would take care of the storeroom clerical help, freight and express and is aimed to make it self-supporting. In the case of local invoices or lumber invoices, no charge of 10% is made, these items being charged out at cost. However, with large amounts of material that come in and go right out for special repairs or new construction, this practice is not followed. The card enables the storekeeper to tell at a glance what amount he has on hand. With the help of one girl, he can keep the records up easily.

Store Methods

As seen from the illustration, an employee comes to the wicker gate and presents the requisition which must be signed by a foreman or the superintendent. This requisition must specify the exact quantity needed and for what department and if for certain machines, the machine must be designated. A clerk


NEKOOSA-EDWARDS PAPER CO.

MAIN OFFICE

PORT EDWARDS STORE

MERCHANDISE RECEIVED

weighs or counts or measures out the commodity required, just as though money was being handled in the transaction, and the clerk retains the slip while the workman carries off his purchase.

The slips are priced from records of purchase invoices, and the extension is made, and we then see another typical store feature, a register system in which the balances are brought forward from day to day.

Mill Departments

Our mills are divided into departments for convenience, and the paper mill is divided as follows:

Dept. No. 1—Beater Room.
2—Beater Room Basement.
3—Machine Room.
4—Machine Room Basement.
5—Finishing Room.
6—Finishing First Basement.
7—Finishing Second Basement.
8—Planing Mill.
9—Boiler House.
10—Engine Room.

39—Lighting Wiring.
40—Motor Wiring.
41—Motors.
44—Roofs.
45—Windows.
47—Piping.
48—Shafting.
50—Sundries.

Accounting Methods

These accounts are lined up on the store register in the order as shown, and charges are posted as they come in to the account number, with the total being brought forward from slip to slip. In this way, on the first day of the month the total material charged out during the month is accounted for on a summary sheet, which is sent to the main office, and in this way the store is given credit at one time for all the material used and the different mills and departments are charged, saving a multitude of entries, and giving results with a minimum of effort. It formerly took from six to ten days of the month to make this summary, and it is now done in less than a day.

Benefits of System

But a further benefit of the system is that when the charge is made to the department, a carbon copy is made which goes back to the fore-

man with his original requisition. He can then check up each morning the material with which his department is charged. By returning these at once, trouble is avoided.

In this way the control over the charges and the inventories is at all times under the hand of the storekeeper, and it spreads the work evenly over the month.

Equipment

Close examination of one of the cuts shows the orderly steel racks with ladder equipment, all labelled, to facilitate the handling of material. Electric lights are so arranged that the lights for just one section, when needed, are used. A substantial platform scale makes weighing of material convenient, but lighter material is weighed on a small portable scale. A most interesting improvement is the way in which belting and hose are handled. Racks holding the belts are suspended between heavy upright timbers, and these are so situated that the belt could be laid out for measuring for over a hundred feet. This feature will appeal to storekeepers generally. A more satisfactory way to handle belting would be hard to conceive.

Handling the Felts

The wool felts are kept in tight cupboards, the bottoms of the cupboards lined with wire screen to keep out the mice. Heavy shelves hold the wires in their boxes until needed. The orderliness and neatness of arrangement tend to emulate carefulness on the part of those who use the materials.

No traffic is allowed through the store room, and this is a most important item in store room management. The workman comes to the wicker gate and presents the slip, and he goes away without entering the store.

Reclaiming Department

Every store should have a reclaiming department connected with it. Materials which are only rusty or bent, but which are otherwise good, can be reclaimed. A little emery paper, a vise and the right man can redeem considerable quantities of material. As high as $1500.00 a month has been redeemed from the scrap pile by the reclaiming department at Port Edwards. Last year no cap screws nor set screws were bought, the entire supply coming through the reclaiming department. Where the department from which the material came is known, when the reclaimed article is turned into the store, that department receives a pink credit slip. In such cases the department is given 80% of the credit and the store gets 20%, to cover the cost of repairing or reclaiming.

Development

The store is presided over at Port Edwards by Einar Ross, who has seen the idea develop from the crudest form to the present way of handling materials, and to him must be given credit for many of the improvements. The Nekoosa-Edwards Paper Co. does not claim the credit for all these ideas in store management, but owes much to mills who had studied the subject, particularly the Kimberly-Clark Co., of Neenah. In like manner, they will welcome any questions along this line and will gladly show other mill men what they have.

Reciprocating Engine Lubrication

(*Continued from page* 114)

grit and dust proof will keep the oil in its original state free from foreign matter.

Increased Cleanliness

The equipment will give your oilroom the touch of cleanliness, efficiency and economy that comes with the elimination of oil-soaked waste, oil-coated floors, dripping faucets, dirty funnels and measures. All of the oil will be either in the equipment or in use. There will be no waste.

This class of equipment is in strict compliance with the requirements and wishes of the National Board of Fire Underwriters, and through its use there will be a material reduction in the fire hazard.

Each tank holding 120 gallons of oil is 21 inches in width, 50 inches front to back, and 31 inches high, which means a saving in space when compared with any other system or method.

There is no upkeep cost. The equipment will serve you a lifetime and longer without any expense whatever.

Largest Pulp Wood Stacker Ever Built

By H. S. GODDARD

THE accompanying illustration shows clearly the general arrangement of the stacker recently erected for the Lake Superior Pulp & Paper Company at Sault Ste. Marie, Ont., Canada.

This stacker was designed to solve the problem of storing of a certain quantity of two-foot pulpwood upon an area which was limited and rather irregular in shape. For this reason a pulp stacker made with a rigid boom always extending in one direction could not be used satisfactorily as part of the area could not be served by such a machine.

For this reason a stacker, of the special design illustrated, was designed and built, and is now operating satisfactorily. The wood is received in the cable conveyor, shown to the left, which comes from the slasher building delivering to the wood room. This conveyor has a capacity of practically 100 cords of 2-ft. wood per hour, and is a standard Jeffrey wire rope conveyer operating at a speed of approximately 100 ft. per minute with circular flights spaced 3 ft. centers. The trough of the conveyer is made on bents spaced 16 ft. centers and one-half of the trough between the bents is hinged, allowing the trough to drop down, and by the use of these doors the wood is turned from the trough and dropped into the hopper of the stacker by which it is elevated and placed in storage.

The stacker consists of a structural steel form about 40 feet square running on two standard gauge railroad tracks which are spaced 40 ft. centers. In order to overcome the inequality of loading caused by the peculiar design, the stacker travels upon four trucks, two of which are six-wheeled equalizing trucks, the other two are four-wheeled equalizing trucks, the wheels so spaced as to make an excessive loading either upon the rails or ties of the track impossible. Upon this truck is mounted a stiff-legged derrick with the boom swung back between the stiff legs. The mast of the derrick is open, allowing the boom to extend through it down to the ground, so as to receive the wood from the stacker without the use of an intervening unit. This boom is 4 ft. deep and 6 ft. wide and is braced back to the top of the mast by three sets of double guys, each made up of four 2-inch wire ropes. These guys, of course, are provided with turn buckles, equalizing the strain upon them. The length of the boom from the center of the lower pin to the head shaft of the conveyor is 180 feet, while the boom overall is practically 200 feet long. The distance from the head shaft to the track level upon which the stacker runs is 106 feet, allowing the stacker to pile pulpwood to a height of over 90 feet, with no chance of the wood interfering with the free swinging of the boom.

Upon the boom is a wooden trough in which travels one strand of chain fitted with spurs and attachments every 5 feet, as shown on the attached cross section. It has a capacity of 40 cords of 2-foot wood per hour, although it has handled as high as 60 cords per hour for a short period. The motion of the boom allows the stacker to cover the 40-foot space over which it runs between the tracks, adding many thousands of cords to the storage capacity of the mill. The special features of this design have given an elastic and economical scheme for the handling of wood and have proved very satisfactory to the paper company.

The Purpose and Scope of the Work of the Cost Association of the Paper Industry

By B. E. HUTCHINSON
Treasurer American Writing Paper Company
(Address delivered at the Convention of the Cost Association)

THE time has passed when it was appropriate to speak in general terms of the necessity for more and better cost work in the paper industry or to deplore the fact that interest in the subject was at such a low ebb. Your presence here today is a testimonial to the recognition which cost work has long deserved and has now won.

We have been in the habit, more or less, of using occasions of this kind to preach the value of cost work. It seems to me that in this meeting we can well afford to take such interest for granted, and to confine ourselves to the consideration of plans for accelerating the development of cost work in the paper industry along sound lines. The same fundamental factors in today's situation which have contributed so largely to securing for the cost accountant his opportunity, make it imperative that this opportunity be improved without delay.

Most if not all of you are familiar, I presume, with the incidents which preluded the formation of the Cost Association of the Paper Industry at Buffalo last December. This work had previously been conducted as a section under the auspices of the American Paper & Pulp Association, but consistent with changes in the form of that organization which were then under consideration and which have since been adopted, it was decided that the development of cost work could best be pursued through the medium of an independent but affiliated organization, particularly as there had grown up in the minds of a number of the manufacturers interested a conviction that the problem should be attacked from a different base.

Now I am not an old enough campaigner to review for you the various phases through which the idea that Cost Work as an essential feature of the business of manufacturing paper has progressed. I do know that there have been more than several organizations in existence at one time or another whose professed object was the promotion of cost work, and I also believe that most if not all of the various manufacturers' associations have had committees appointed and reports rendered on this subject. I have read and reflected upon several of these reports myself, and, I have no hesitation in saying, with profit. However, these reports seem to me all to suffer from the same inherent defect in that they give a general treatment of the subject, and therefore lose the practical value that can be attained only by the application of these generalities and theories to the difficulties encountered in actual manufacturing practice, and are deficient in that little or no recognition was given to the many and devious means resorted to in the overcoming of these difficulties.

To be sure there are general principles underlying the correct determination of the cost of paper, principles which underly the determination of the cost of any manufactured product, for that matter, but so long as discussion is restricted to these generalities it remains academic. Those of you who have taken one of these general reports and attempted to apply the principles so lucidly expounded to your own mill conditions fully appreciate how much remained to be done.

It must, I think, in all fairness be admitted that excellent as were many of the reports on cost which have at one time or another been submitted to various branches of the paper industry, their ultimate effect has not been fully up to the expectations of the time at which they were submitted. The difficulty was, and it seems to me must always be under the same circumstances, that with the rendering of the report the tendency was to consider the job done, while as a matter of fact it had only just begun.

The Cost Association of the Paper Industry was born of the idea that the development of sound cost work is necessarily a continuous performance. Cost work, in one aspect at least, is like the proverbial housework—it is never done. It is never done at a particular plant, and it will never be done in the industry as a whole. You will find today at the plants where cost work has been carried to its highest refinement, the most generous recognition of the shortcomings and fallacies of the work now conducted, and the most enthusiasm for its further improvement and simplifications. Conversely it has been my experience that the plants exhibiting the most complacency regarding the assumed perfection of their present cost system had the least to boast about.

However, if we are to assume, and I do not see how

it can be denied, that there is room for improvement in the work of all of us, then the extreme desirability, if not the actual necessity, of some correlating factor in the situation becomes apparent. It is precisely this function which the association aspires to fulfill. We believe that progress can be accelerated by making experience the common property of all.

In this connection it should be observed that there is an essential difference between the exchange of information regarding methods of cost finding and the exchange of information upon the processes used in the manufacture of the product. It is quite conceivable that a manufacturer may not care to exchange information as to his actual costs, or on the details of some special process to which he subjects his product. Some special advantage may very well be gained by reserving as long as possible the exclusive benefit to be derived from such knowledge, but this special advantage may be lost or largely impaired through the ignorance of some competitor of his costs. The very worst competition is ignorant competition, and knowledge of cost is the most beneficial when shared by the largest number of people.

The Cost Association of the Paper Industry represents an attempt on the part of a number of paper manufacturers to give articulate expression to their faith in the value of cost work to the industry at large, and the expression of their conviction that the development of sound cost work throughout the industry can be best promoted by a spirit of thoroughgoing co-operation.

It might be well in this connection to state that this group of manufacturers, as will be manifest to anyone who carefully surveys the list of members and officers of the association, is not restricted to any one branch of the industry, nor to any one section of the country. In fact it is distinctly the aim of the association to be national in character, and to cover the whole industry in the scope of its work. It is decidedly to be hoped that there will be no misapprehension on this score, as any limitation placed through such misunderstanding upon the scope of the association's work would limit its usefulness by just so much.

Allusion has already been made to the fact that in the discussion of cost problems progress is largely limited if restricted to the consideration of only generalities and theories. If you will follow the plans which the association is now maturing, you will see that provision is being made to assure that the practical aspect of cost finding receive their proportionate share of attention, and it is on the feasibility of this aspect of the association's plans that depends the value of the contribution which will be made to the industry. Theories and generalities have their place, but just as the cost department of each of your mills has to justify itself as a contributor to the profitableness of the whole institution, so will the Cost Association of the Paper Industry have to demonstrate that it is stimulating and facilitating the development of practical cost work if it is to survive. Personally I would have a very limited interest in an association devoted exclusively to scientific research on this subject. The need is for something that will deliver the goods, and the scope of the work planned for this association goes away beyond the preaching of theories right to the heart of the matter, the practical application of sound theory to the everyday problems of cost finding to be found in every one of your mills, and to the organization of the brains and experience to be found in the industry to one effective and expeditious solution of these problems.

This may sound like a large order to some of you, and to be sure it is a large order. It is so large, in fact, that it will be impossible to fill it unless every man in the paper industry turns in and does his share. It will be impossible to fill it even fairly satisfactorily unless all of you here, and two or three times as many more can be induced to undertake to carry a proportional part of the load.

It might be well right here to dwell a moment upon the fact that this co-operation of which we speak has got to be many-sided co-operation, and to be successful the attitude of association members will have to be to lay more stress upon what they can give, than upon what they can get. Remember that this co-operative idea is predicated upon the conviction that sound cost work on the part of your competitor is of almost if not quite as much benefit to you as it is to him, and you will appreciate that when your competitors begin to sell without regard to cost, that it frequently does you as much or more harm than if you were unable to ascertain your own costs for your guidance.

As a practical example of one of the aspects which co-operation may assume, the American Writing Paper Company stands ready today to give you the benefit of any experience which we may have had in the working out of cost problems, and our experience has been quite varied. If we have a condition that closely parallels anything that is now troubling you, we will be pleased to give you full information as to the manner in which we have dealt with the difficulty. You may come to us and fully inspect the workings of our cost system. You may have samples of any or all of our forms. We will explain everything regarding our method of ascertaining cost to you as clearly as we are able. In fact we would even go further than that, we would be glad to send a man to you, upon your request, and at your expense, to give you the benefit of any advice you might seek.

Does this seem a little far fetched to you? You may be interested to know that the association has already been called upon and has furnished just that service. I do not feel that it would be quite ethical to give the name of the manufacturer, but it is a

fact that we were asked and did send a member of our executive committee who has had a broad experience in cost accounting work to confer with a paper manufacturer who was contemplating the installation of a cost system. The arrangement was an entire success, and was so thoroughly appreciated by the manufacturer in question that he wishes to have another consultation later on. This is only one of the phases of the method which the association is considering pursuing in the development of the work.

It would be a mistake on the part of anyone, however, to consider for one minute that work of this kind is as one-sided as it was made to appear above. Unless carried to excess there is no doubt but we all benefit largely by taking advantage of opportunities to see what the other man is doing, to argue moot questions out with him, and to subject our own convictions to his skeptical scrutiny. For my own part I would be glad to see the several men occupying positions of responsibility in our cost department spend a day or two every month in the serious consideration of problems confronting other manufacturers in the working out of their costs, and I want to announce right here for the benefit of some of my associates in this enterprise that I am going to avail myself of the other end of this co-operative plan and get some advice and consultation on a couple of knotty problems which are troubling us just now, such for example as the measuring of stock that is pumped to the beaters through pipes.

No, I would not blame anyone for a skepticism towards a professedly philanthropic interest in their affairs, but I assure you that I have no such attitude toward this work, and while I am willing and enthusiastic about going the whole way toward the co-operative development of sound cost work in the industry, I fully expect in the long run to get just as much as I give, and what is more I feel the need and will greatly appreciate the opportunity for such an exchange of ideas and experience.

The association proposes to publish a bulletin. Here will be an opportunity to discuss through open letters points of interest that are not of sufficient importance to warrant personal interviews, and upon which general discussion would be particularly desirable. Through the medium of a bulletin it will be possible to run a sort of continuous convention, as it were. It has the further advantage in the discussion of certain points of dispute upon which heat is sometimes developed in that the possibility of physical encounter is entirely precluded. We would all be interested, I am sure, in having Major Franklin and Mr. Bush discuss at long range the propriety of including interest charges in cost.

Arrangements have been made with the American Paper and Pulp Association for a room in their quarters in New York, and Mr. Peterson has been engaged to devote his time exclusively to the work of the association under the general direction of Mr. Stewart. Mr. Peterson is an experienced accountant, and a number of manufacturers have signified their willingness to furnish Mr. Peterson with a complete set of their forms and instructions covering the operation of the cost system in effect at their plants. These will be available in the New York office for the inspection and study of any member interested, and Mr. Peterson will be pleased to render any assistance possible.

The executive committee hold their meetings in the New York office, and at the last two meetings the custom was instituted of inviting any of the membership who might be in New York on the day of the meeting to drop around for an informal discussion of cost work. Several members have already availed themselves of this privilege and it is hoped in time that these meetings will come to be a sort of open forum for the discussion of cost work, and that they will be sufficiently well attended to furnish a group of experienced people competent to give valuable practical advice upon any cost problem which might be raised.

Another phase of association cost work which has already proved its practical value is the work of local associations, organized both in geographical units, and along the lines of classified groups within the industry. There has already been organized a Connecticut Valley Section of the Cost Association of the Paper Industry, which has held a number of very interesting meetings. Two of these meetings were attended by over 150 people, representing over 20 different paper manufacturers. You will observe that the program for this convention calls for committee meetings to consider the further development and extension of both of these ideas. These local and classified group associations should prove to be very useful indeed. There are limitations to the frequency with which general conventions such as this can be held, and cost work should not be permitted to lag between times. These smaller local conventions perform another very useful function in stimulating interest in cost work among the clerks and minor executives in the cost and manufacturing departments of the several plants in a district—people who ordinarily perhaps would not get to our general conventions. Provision must be made for bringing along each year new blood in our organizations, and in keeping those who are in the harness from going stale. Local meetings of the kind referred to serve to stimulate such interest to a truly remarkable degree, and justify themselves on that ground if on no other.

You will hear from President Burchell tomorrow a report on the progress made to date, and I do not want in any way to steal the thunder from his guns by either discoursing at length on what has already been accomplished, or by anticipating him in disclosing prematurely plans which he has developed for

the future, but I am sure he will take no exception to my emphasizing the hopelessness of our position unless we succeed in securing from the industry at large a thoroughgoing acceptance of the co-operative idea. In fact, I believe now is the time to lay emphasis upon the importance of the co-operative idea rather than upon specific plans for future organization. If this association can be made to grow as the result of the earnest and energetic work of a representative lot of paper manufacturers, I have no misgivings as to the form its organization may take nor the scope of its work. If, however, it is left for a few of us to carry the load, and to try and patch together an association which may eventually prove sufficiently attractive to secure general acceptance, there is a large chance for failure. The vitality of this association and its power to do effective work depend upon the breadth of its foundations and the active participation in its work by the industry as a whole. The organization is and should remain absolutely flexible. The germ of the idea is here—co-operation to the end of improving competitive conditions in the industry for the benefit of all—it is up to you who are here, and even more to those who are not here today, to take hold of this idea and put it over. You have today as active and energetic a set of officers and committeemen as could be wished. I can say that without flattering myself, because I am the only lazy one in the lot. I don't have to prove that. I admit it.

Of course there are certain adverse factors to be met, and wherever possible anticipated. There are still a few manufacturers who retain on general principles, their misgivings as to the value of cost work or to the practicality of applying it to the paper business, which amounts to the same thing in the long run. We will not review here the persuasive measures to be used against such objectors, as this work comes more properly within the scope of the manufacturers' associations, and is receiving attention there from time to time.

Then there is the man who thinks cost work an excellent thing, but feels he can't afford it. It costs too much to get cost, so he says. He has got to be convinced that it costs too much to go without it, and his position is a fair one so long as he can hold it, which is not long in the face of facts. The cost of cost work is a great bugaboo. Of course it is possible, yes, easy, to be extravagant in the development of cost work, the same as it is possible to be extravagant in any construction work, but it is not necessary, and it is not desirable. Cost work usually becomes extravagant when it is attempted to develop it too fast. It is possible, just possible, to walk into a paper mill and put in a cost system overnight, but, believe me, it would be expensive! But the same system developed over a reasonable period of time and digested by the organization as it grew along, should pay for itself by the increasing effectiveness with which the business could be managed.

Neither should there be any conflict between the association and the field which the professional accountants claim as peculiarly their own. Personally I am strongly of the opinion that a manufacturer undertaking a thorough revision of his cost or accounting work should employ professional accountants to advise him. It is a big job, and they can easily earn their money. But the first thing that should be done is to tell the accountant as representatives of yours to go to some of your fellow association members and see what has already been done. The biggest complaint to be made against the professional accountants is a certain disposition displayed at times to treat every cost job as something brand new. There has been some considerable work done on the devising of cost systems for paper mills, and it would be an excellent idea for a man undertaking the installation of a cost system to inform himself on what had already been done, particularly since such information can be had for the asking.

Notes on Dyes and Their Application to the Paper Industry

(*Continued from page* 112)

or less dye, as the case may require. The result should be expressed on a percentage basis. When matching up a yellow it is well to add a small amount of a red, such as saffranine if the case is auramine or some other red, as the case may require, to each of the sheets. When matching a red, the reverse is true. This enables one to distinguish all differences in shade with greater facility than if the other colors were not used.

There are three general classes of aniline colors commonly used for coloring paper. In addition to these, there are two other classes less commonly used, namely pigment dyes and dyes of a vegetable origin. In the succeeding article we will take up the first class of aniline dye stuffs, namely, basic dyes, giving a few general remarks applicable to the class as a whole, followed by a discussion of the principal members of this group of dyes from the paper making standpoint.

(To be continued)

PRESENTED FOR YOUR SCREENING

The accompanying diagrams and specifications give an accurate idea of the simple construction and adaptability of a collapsible table suitable for use in the paper mill finishing room, printing and lithographing pressrooms.

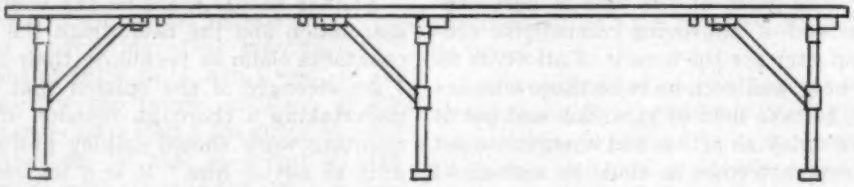


Fig 4.

It is a good time, labor and space economizer, as when not in use it may be folded up and stored with smallest amount of effort and makes available an additional amount of floor space.

SPECIFICATIONS

Figures 1, 2, and 3 has a scale of ½" per inch. Figures 4, 5, and 6 has a scale of ⅜" per foot. Fig. 4 shows the table in its standing position. Fig. 5 shows the table in a collapsed position edgewise. Fig. 6 also in the collapsed position, showing the entire bottom. It is very important that the table should not collapse while people are working on the table, therefore the casting, Fig. 3, has been made to securely fasten the end of the brace. Fig. 2 is a cross section of Fig. 3 from A to B. C shows a slot; the end of brace D has a tongue which fits into this slot. The set screw G would have to loosen up ⅛" before this tongue would come out of the slot; the jam nut F prevents the screw from loosening, thereby securely fastening the table in the standing position. This table is 11½' long, 3' wide, 1¼" thick, the rails 1⅞"x4"x2' 10"; the legs are made of ¾" gas pipe with T and elbow joints and caps as per drawing; the button E in Fig. 6 is placed to lock the legs down in the collapsed position. Fig. 1 shows

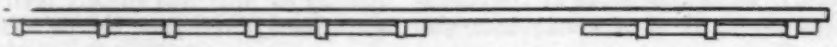


Fig 5

the edge view of the bearings. These bearings are bolted on to the rails with 4 f. h. stove bolts each $\frac{5}{16}$"x1⅞"; the bearings must be cut flush into the rails so that there will be no projections to mar the table when they are stacked on top of each other.

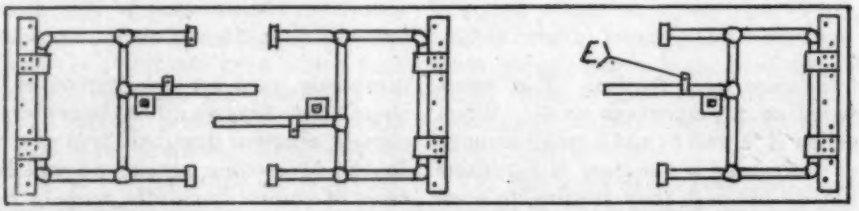


Fig. 6

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The most efficient self oiling bearing on the market.

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3 Paper Machines 15 Coating Machines

After the bearings are bolted on to the rails the latter are fastened with f. h. screws, 2¾" No. 16; the

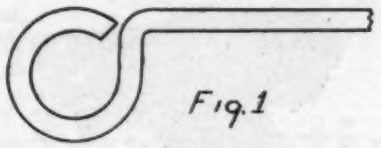

Fig. 1

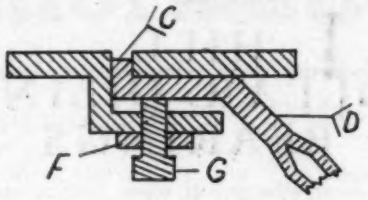

Fig. 2

holes for said screws should be slotted to allow for shrinkage. The T joint on the braces is fitted loosely

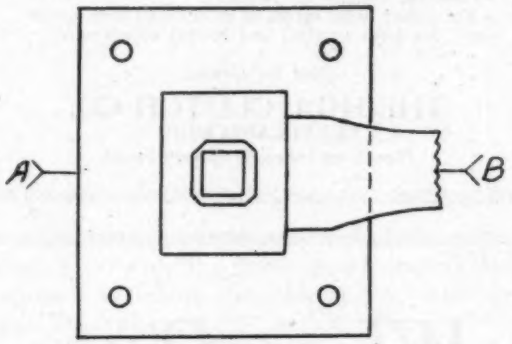

Fig. 3

on the cross bar so it can be moved slightly to one side when fastening it in the collapsed position.

Cleanliness

Loyalty is measured by character. Clean minds, clean habits, clean ambitions are the necessary essentials that determine the degree of loyalty and faithfulness in your employees.

These essentials are always in proportion to the light and cleanliness of the surroundings, as clean habits and clean character can only thrive in clean surroundings.

Clean surroundings inspire self-respect and pride in personal appearance, which is always reflected in the quality of the product.

Employers who have installed a system of cleanliness in their plants are unanimous that their solution of labor troubles is not in shorter hours, better pay, etc., but in the better personal relationship established between the employer and employee as a result of cleanliness in working conditions.

To insure perfect formation—

Get the proper amount of SHAKE on the WIRE and maintain the DECKLE FRAME STATIONARY with an

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- **It will prevent thin places in your sheet, due to the vibration of the Slices.**
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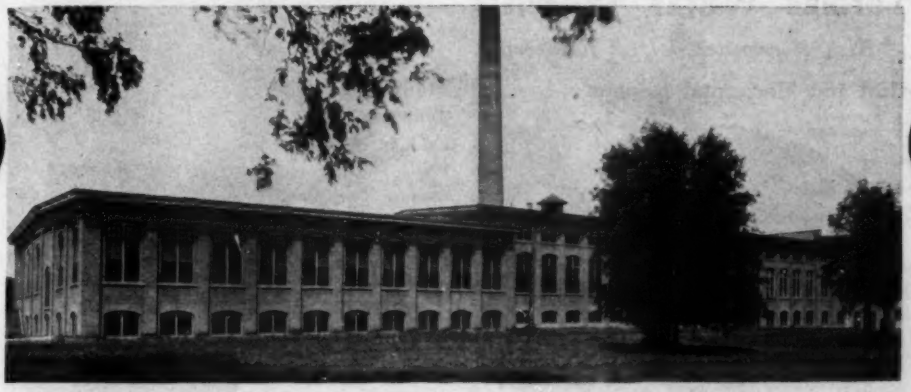

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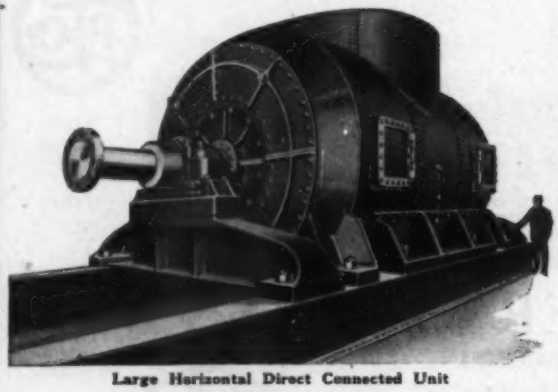

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Women

There are many mills who employ a large number of women, and have accidents happen with appalling frequency, due in a large number of cases to the old mode of dress—the shirtwaist and skirt. This must be abolished before any headway can be made to eliminate the accidents.

Where a woman superintendent, forelady or welfare worker is in charge, a campaign should be mapped out and left in their hands for execution to

bring about the abolishment of the shirtwaist and skirt and the adoption of the overall costume for every woman employed in the mill who may come in close proximity to moving machinery.

The swinging, dangling skirts will no longer become entangled in machinery and cause serious accidents.

The loose, flimsy waists will no longer catch on every projection, to get torn and ruined—removing one of the causes of irritation that lowers the morale of women workers.

Slitting Odd Sized Rolls

The sales department in a paper mill is naturally anxious to write up all the orders they can for the mill they represent, and it is not unheard of for a sales manager to put the gloves on with the boss papermaker or the finishing room boss when an order is turned down through the inability of the mill to turn out paper in the particular size or character of roll which the customer wants.

When the mill product is sold many months ahead, the manager is usually as independent as a Washington hotel owner in war times, so that when the salesman comes along with an order for "freak sizes" of roll, he is usually told to take his order and depart thence toward the regions of eternal summer, and then some more.

The reason for prejudice in the average mill against "freak sizes" or kind of roll out of the ordinary—and, for that matter, prejudice against any kind of rolls at all—is that the production of paper in roll form is recorded as a troublesome proposition by the average finishing room boss; and the average finishing room boss is right and his judgment is evidently founded on sad experience. Some mills carry it to the extreme in trying to abandon roll production altogether and encourage orders for flat stock and discourage orders for their product in any form of roll, big or little, especially if the rolls have to be produced in an exacting and careful manner.

The average finishing room boss has a feeling that something sour is going to happen to him when he is faced with an order for fussy sizes and kinds of rolls, and when he looks over the average equipment in the average mill by which roll paper is supposed to be produced there is no room for surprise at the feelings of the "super" or his foreman.

Altogether too little study and technical experience have been given to the problems of slitting and rewinding.

The Cameron Principle Slitting and Rewinding Machine Universal Type No. 8 deserves to be called a universal type machine, as it is used to convert any kind of paper made, from the lightest tissue to bag stock and box board, into rolls of any size which might be required, from tiny little midget rolls to great big jumbo rolls, provided the latter do not exceed 36 inches in diameter. The machine of course has limitations as to the size of the largest roll it will produce, which is 82 inches; as to the widest web it will handle, and 36 inches as to greatest rewind roll which it will produce. Aside from this limitation there is practically no other limit which will prevent the machine from being called "Universal," with every right and title to the name.

Paper mill finishing rooms should certainly be equipped with up-to-date and efficient means for converting rolls of paper into any size or kind of roll

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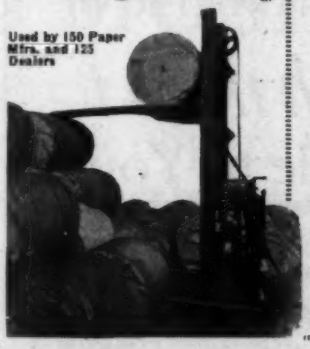

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a customer might require. Having these means, it is neither expense in time nor risk of any kind to convert a mill roll into whatever size of roll the customer may need.

This policy certainly pays in dollars and cents as well as good will, as the customer is usually willing to pay liberally for any special kind of service delivered by the mill; and ability to deliver this service certainly gladdens the heart of the average paper salesman, as it helps to make his order book and his check book more prosperous.

Efficiency Graphs

Daily output records for each tour and department should be drawn up in the form of easily intelligible percentage graphs and placed where a comparison may be made by the workers on each tour as to their efficiency. In conjunction with this a weekly graph showing percentage efficiency between the different units, giving the percentage loss through "broke" and accidents, will greatly stimulate the interest in departments and increase their morale and loyalty.

There is no more reason in keeping from the workers a means of knowing what the exact results of their combined efforts are than to keep the result of a baseball game of other competitive effort from those participating.—R. M.

Handling

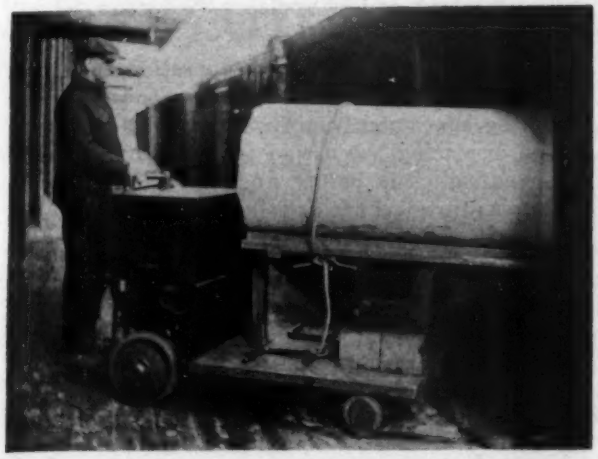
In nearly every case where goods of any kind are being transported over distances within the premises of a paper mill, mechanical devices such as lifting apparatus, industrial trucks, cranes, monorail hoists, etc., may be used to a decided advantage in accomplishing the transportation quicker, better, and by affording substantial economies in space and labor.

If your paper, either in roll or flat sheets, has to

be moved as short a distance as fifty feet, there is some mechanical means that will transport it profitably, while if the haul is fairly long it has been conclusively proven in hundreds of cases that the services of from eight to ten men with hand trucks can be dispensed with.

New uses for mechanical means of handling and transporting your products will constantly be found, and all that is needed to make them a profitable investment is to keep them busy.

As recently as a year ago the industrial truck was a rarity in the paper industry, but now there are hundreds in daily operation throughout the



country, and so great an economy have they effected that they have been pronounced almost indispensable. Careful study of those who are in positions that enable them to know of needs in handling and transporting paper mill products always results in their unqualified recommendation of mechanical equipment to fulfill all of the requirements encountered in the paper industry.

However, in order to meet the particular conditions accurately, a careful study should be made of your particular requirements, as there have been perfected and standardized many different types, and the choice of the right type must be made with your own particular requirements in view, as, for instance, under certain conditions a monorail trolley will serve best, while under other conditions the load carrying power truck, hand lift truck or tractor trailer system will be found more efficient.

All of these various systems are now being used in rapidly increasing numbers for the transportation and handling of raw material, machinery and finished products in paper mills, paper warehouses, and by printers.

Aside from the very considerable savings effected in the cost of moving material, the question of labor is a most important factor. The mechanical means is able to work longer with less physical strain on

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the operator, and is consequently more reliable than the hand truck. A boy or woman may be employed as an operator or driver, but not as hand truckers.

The noise and turmoil of hand trucking, the question of the supply of workers, the necessity for constant supervision, are all obviated by the installation of the mechanical means that will best meet your requirements.

Relative Costs of Ash Handling

Many engineers and power plant executives have been surprised when they quietly sat down and figured out for themselves the saving that resulted when their ash wheelers were replaced by a steam jet ash conveyor.

The boiler plant of a large corporation contains a battery of one 500- and five 150-horsepower boilers, operating continuously. An ash conveyor was installed, replacing the use of men and horses. The ash-handling costs before and after the ash conveyor was installed are as follows:

COST OF ASH DISPOSAL PREVIOUS TO INSTALLATION OF ASH CONVEYOR
(Per 24-Hour Day)

2 ash wheelers	$10.88	
1 teamster	4.08	
1 horse and feed	1.50	
		$16.46

COST OF ASH DISPOSAL AFTER INSTALLATION OF CONVEYOR

1 laborer (9 hours)	$ 4.08
Saving (24-hour day)	$12.38

(Between fire cleanings this laborer acts as assistant fireman and boiler room helper.)

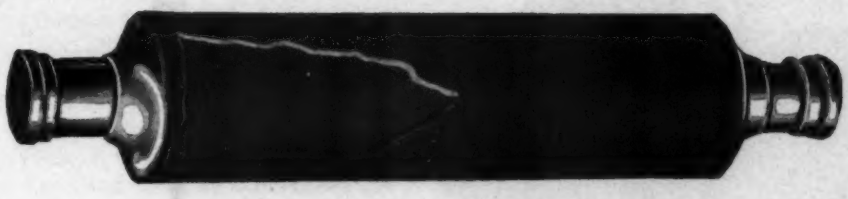
The ashes are left on the boiler room floor in front of the boiler until the cleaning is completed, and are then put into the conveyor, which handles the complete cleaning in about seven minutes. The boilers are cleaned every two hours.

It will be seen that the actual time the laborer spends at work handling ashes is relatively small. If the time spent on other work was charged against that operation the savings would be decidedly greater.

These figures bring home forcefully the economy that results from the installation of labor-saving equipment and emphasize the importance of carefully watching every item of boiler plant expense.

Care of Belts

When a belt becomes oil-soaked it should be taken off and washed well with gasoline to remove the grease, and then given a light rubbing application of neatsfoot oil with a cloth or sponge. This will keep your belts always in good condition and will prevent the necessity of applying belt dressing, which may in time ruin the belt. If neatsfoot oil is not on hand castor oil may be used as a substitute.



Rubber Covered Rolls

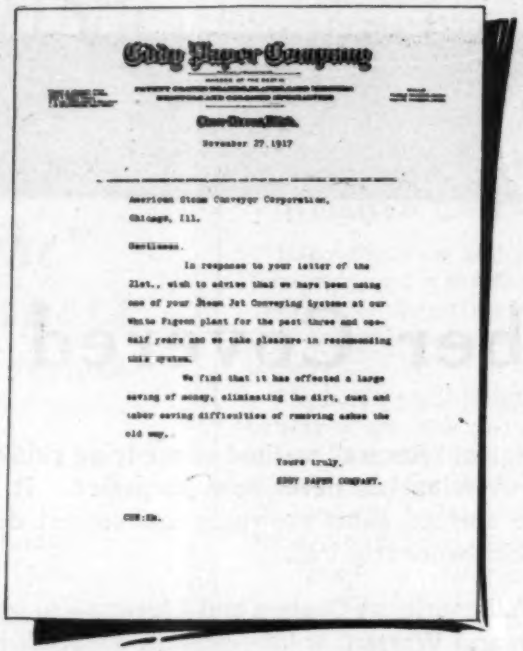
The original "Revere" method of applying rubber to iron in roll covering has never been surpassed. It insures a uniform surface, exact crowning and correct density for the specific work required.

Our two factories at Chelsea and Chicago—to care for the Eastern and Western trade—possess unexcelled facilities for covering the following rolls used in paper mills:

Press	Harper Couch	Waxing
Pressure	Primary Press	Design
Wringer	Inking	Size
Couch		Guide

We also manufacture Rubber Belting, Machine Hose, Deckle Straps, Screen Diaphragms, Suction Box Gaskets and Connections.

United States Rubber Company



Eddy Paper Company

November 27, 1917

American Steam Conveyor Corporation,
Chicago, Ill.

Gentlemen.

In response to your letter of the 21st., wish to advise that we have been using one of your Steam Jet Conveying Systems at our White Pigeon plant for the past three and one-half years and we take pleasure in recommending this system.

We find that it has effected a large saving of money, eliminating the dirt, dust and labor saving difficulties of removing ashes the old way.

Yours truly,
EDDY PAPER COMPANY.

CHE:Eh.

An Ash Conveyor That Saves Money

HERE is a letter from the Eddy Paper Company in which they emphasize the economies of the American Steam Ash Conveyor.

Note the last paragraph: "It has effected a large saving of money."—a statement based on three and one-half years' experience.

The Eddy Paper Company once had ash disposal problems; the use of the American Steam Ash Conveyor solved them. Scores of other paper and pulp mills too, have eliminated their high ash handling expenses by the installation of our equipment.

Being the original steam ash conveyor, the American has behind it basic patents, developed and perfected by sound engineering. Ash disposal is not a side line with us. Our whole thought and energies are and always have been devoted to this one subject. That is why so many paper and pulp mills are installing American Steam Ash Conveyors in their boiler plants.

If your ash handling costs are high or your present methods unsatisfactory, you will want to investigate our equipment. Fill out the coupon below for our 160 paged book, "Modern Methods of Ash Disposal." Sent free to engineers or paper mill executives.

AMERICAN STEAM CONVEYOR CORPORATION

Ash Disposal Engineers

CHICAGO: 326 West Madison Street **NEW YORK: 110 West 40th Street**

Number of boilers .....
Make .....
Horsepower .....
Stokers .....
Average Pressure .....
Present Method of Ash Disposal .....
.....

American Steam Conveyor Corporation,
Dept. P.

I am interested in economical ash handling. Send me your book.

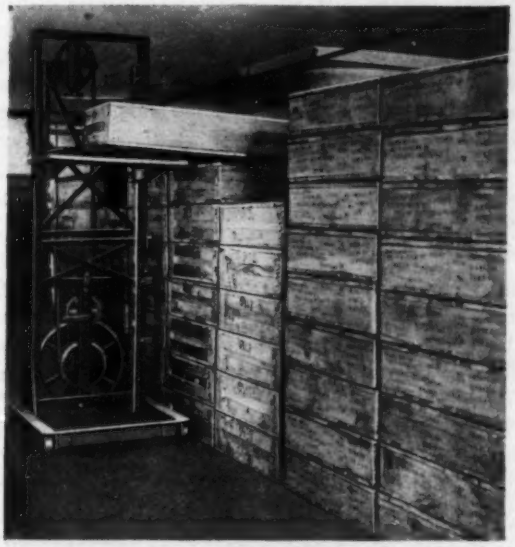
Company .....
Refer to Mr. .....
Position .....
City ..... *State* .....

COPYRIGHT 1918, BY AMERICAN STEAM CONVEYOR CORPORATION

Piling Cases

The increases in the cost of manufacturing and selling paper have had to be met in many different ways. Efficiency systems have had to be applied in every department not already operating with the utmost economy.

Most conspicuous of the improvements along the line of efficiency that have been made in more than 150 mills and 125 dealers' warehouses is the method of tiering roll and flat stock so as to utilize that portion of the storage space which has previously been beyond the reach of the warehousemen and to handle the work with fewer men than would otherwise be



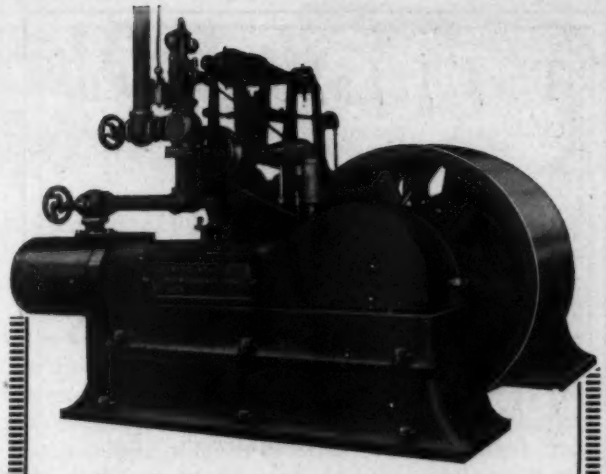
necessary in order to accomplish the same results. In other words, the method in mind is one by which one man alone is able to pile stock to the very ceiling, regardless of weight, size or shape.

One cut shows the system in operation in the warehouse of the Seaman Paper Company at Chicago. The simple turning of a crank elevates the heavy cases to the required level where they can be easily pushed into place. A roller platform on which the case rides, makes this operation easy for one man. To prevent the load from getting away from the operator and dropping to the floor, there is a "safety first" brake, easily governed by the operator.

Another safety feature of the machine used is known as the "lock-to-the-floor" device, which operates automatically to keep the machine from skidding out from under a heavy load.

To Clean Castings

To remove scale from castings, the best pickle (used in the metal industries for this purpose) is dilute hydrofluoric acid in the proportions of one part acid to ten parts water.



Variable and Constant SPEED ENGINES

Paper Mill Economy is assisted very materially by the installation of High Grade Variable Speed and Constant Speed Engines.

Send for List of Installations and Catalogs

CHANDLER & TAYLOR COMPANY
Indianapolis, Indiana

BOLTON QUALITY

WHERE YOU SEE THE ONE

YOU WILL FIND THE OTHER

JOHN W. BOLTON AND SONS, Inc.
Lawrence, Mass.

KNIVES

The C. L. La Boiteaux Co.

Cincinnati Chicago Cleveland New York

TRADE MARK L X QUALITY SERVICE

PAPER BOX BOARDS

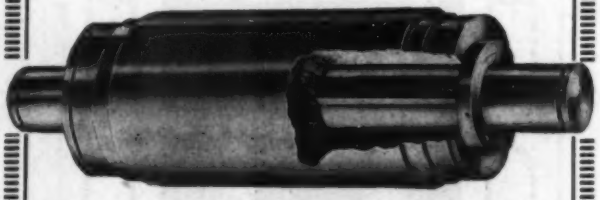
— FOR —

Folding Boxes, Set up Boxes, Paper Cans, Shipping Containers, Etc.

Plain Strawboard
News Lined Strawboard
Book Lined Strawboard
Plain and Lined Chip Board
Single and Double Manila Lined News and Chip Board
Patent Coated Folding Box Board
Clay Coated Folding Box Board
Solid Manila Tag Board
Brown Jute Box Board
Oak Grained Jute Box Board
Marble Grained Jute Box Board
Pasted Container Board
Bristol Ticket Board
Diamond Wall Board
Champion All Leather Heel Board
Also other standard and special grades to order

PERKINS

PATENTED



Paper and Cotton Calender Rolls

¶ The unique construction of these rolls distinguishes them from any other make and creates certain definite advantages which are readily apparent to the roll user. If not already familiar to you.

LOOK THEM UP.

B. F. PERKINS & SON, Inc.

HOLYOKE MASS.

News Personals

(Special to THE PAPER INDUSTRY)

New York, May 15—The New York Overseas Company, 17 Battery Place, has announced the appointment of Cale B. Forsythe, with offices at 902 Hanselman Building, Kalamazoo, Mich., as its selling agent of imported pulp exclusively in the States of Michigan, Indiana, Illinois, Ohio and Wisconsin.

Leo W. Bowmall, vice president of the American Woodpulp Corporation, 347 Madison avenue, recently sailed for Europe, where he will spend several months among the pulp mills in Sweden and Norway.

The Waxed Paper Manufacturers' Association, the newest divisional branch of the American Paper and Pulp Association, has established offices in Room 1603 at 505 Fifth avenue, with O. B. Towne, secretary and treasurer of the organization, in charge. The association now has a membership of more than a score of mills.

The E. E. Lloyd Paper Company, of 501 Fifth avenue, has been appointed exclusive sales agents in the East for three of the largest mills in Wisconsin —the George A. Whiting Paper Company, the Whiting-Plover Paper Company and the Riverside Fibre & Paper Company, all of which manufacture fine papers.

R. S. Kellogg, secretary of the News Print Service Bureau, spent the latter part of April in the West traveling among the news mills and visiting members of the bureau. He spent most of the time in Wisconsin and Minnesota.

A thriving local industry which is contributing in no small way to the industrial prosperity of the city, is the Beaver Brook Paper Mills, Inc., of which James E. Gallagher is president and general manager.

The present structure occupies the site of what was originally a mill to make air-dried strawboard, which was started in 1852, by Nelson Flint, Calvin S. Kulkeley and Amzi Wheeler. In 1867, the late George McArthur and his three brothers, Robert, John and William, of whom only the latter is now living, purchased the mill and continued the manufacture of strawboard.

J. H. Cashman, former purchasing agent of the Robt. Gair Co., has resigned, and is now connected with the Pepperell Card & Paper Co., New York.

K. M. Dodson, of the American Writing Paper Co.'s Holyoke office, has joined the sales force of the Chicago office of the company.

Special to Paper Industry.—It is generally conceded throughout the trade furnishing boxboards that the consumption of paper boxboards has increased materially in the last ninety days, especially to factories supplying boxes for clothing, wearing apparel, knit goods and shoe factories. These seem to be running full capacity, and this condition has naturally stimulated buying in the grades supplied to these lines.

The outlook in other lines is good. Most of the mills are operating full capacity; in fact, some mills at this time have more business on their books than any time since the armistice was signed. Prices are firm and in some instances have advanced as much as two or three dollars per ton during the last ten days. Raw materials still remain plentiful, but prices have not declined to low levels of former years, indicating the users of these materials recognize the fact they cannot be too exacting; in other words, drive the gatherers of waste papers out of business.

Viewing the situation as a whole, good times are here and better times can be expected as soon as fall trade demands come on, which usually start early in July.

Cincinnati, Ohio—Inquiries in the paper market are continually on the increase and the situation is very favorable. In the last two weeks the volume of orders has almost equalled the prewar conditions.

(Special to THE PAPER INDUSTRY)

New York, May 15.—Activity in the paper market has increased at a rapid pace during the past fortnight. Demand for practically all grades has undergone substantial expansion, and indications are that the long-awaited revival of buying has at last commenced. Merchants report consumers to be steadily broadening the scope of their buying, while advices from mill centers state that manufacturers are booking a greater volume of business than at any time since the pre-armistice period.

The market in its entirety appears to be in a healthy condition. Demand is still confined to supplies which are directly needed, and signs are not wanting that consumers have been compelled to enlarge their buying by a broadening of their requirements. Influenced by the heavier movement of stock, prices are becoming firmly established on definite levels. The broad fluctuation which was such an unsatisfactory condition for a long time has largely disappeared, and manufacturers and jobbers are now being provided with a more accurate basis on which to work. Such changes as have occurred have been in a downward direction, but very little alteration has been noted during the past two weeks, and it can be said that the tendency of prices on some grades of paper now is toward higher levels.

One of the most pleasing features of the situation is the expansion of export business. Buyers in South American countries are flocking into this market and the movement of paper in this direction during the past couple of weeks has exceeded that of any similar length of time in many months. Indications are that foreign buyers have purposely been holding off owing to the uncertainty surrounding the market and the irregularity of quotations, and now that prices are established and the market is firming up, the probabilities are they will consistently increase their purchases.

Confidence is expressed on all sides that the paper market is due to experience a period of exceptional activity of the healthiest character, and factors which have a governing influence seem to insure the maintenance of values on at least prevailing levels. In fact, numerous members of the trade freely predict that prices will advance. Emphasis is placed on the continued high cost of production, and it is contended that prices in some instances have been allowed to sink to unjustifiable levels which cannot exist for long.

Strike News

Eau Claire, Wis.—The strike at the Dells Paper Co. mills has been amicably settled and full operation has now been resumed.

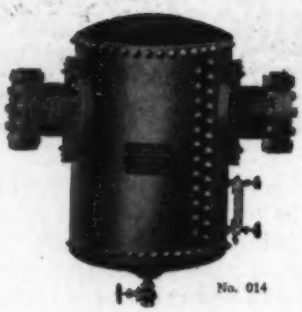
A strike declared by the International Brotherhood of Pulp, Sulphite and Paper Mill Workers of the operatives employed by the International Paper Co. practically tied up the mills of that company in various parts of the east yesterday. Approximately 5,000 men, refusing an offer of about 10 per cent increase in wages, struck, and the Bellows Falls, Vt., plant of the I. P. company was compelled to suspend operations.

At the local offices of the company it was stated in the afternoon that no further information had been received beyond the fact that the men had quit.

Chicago Meetings

Space does not permit us to give the list of all those who attended these meetings, but among those present were a great many of the most prominent paper

(*Continued on page* 153)



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EXTRA HEAVY

Steam Separators

have large areas and ample baffle surfaces, affording the highest degree of efficiency with the slightest loss in pressure. Their design is based upon the most approved mechanical and scientific principles

We do not hesitate to offer this superior line of Separators in competition with any Steam or Oil Separating devices on the market. Fully described in our Catalogue No. 50, which will be sent upon request.

CRANE CO.

Sales Offices, Warehouses and Showrooms:

Boston	Little Rock	St. Paul
Springfield	Muskogee	Minneapolis
Bridgeport	Tulsa	Duluth
New York	Oklahoma City	Fargo
Brooklyn	Wichita	Watertown
Philadelphia	St. Louis	Aberdeen
Newark	Kansas City	Great Falls
Camden	Terre Haute	Spokane
Baltimore	Cincinnati	Seattle
Washington	Indianapolis	Tacoma
Syracuse	Detroit	Portland
Buffalo	Chicago	Pocatello
Savannah	Rockford	Salt Lake City
Atlanta	Grand Rapids	Ogden
Knoxville	Davenport	Sacramento
Birmingham	Des Moines	Oakland
Memphis	Omaha	San Francisco
	Sioux City	Los Angeles

Works: Chicago and Bridgeport.

CRANE, LIMITED

Montreal, Que. Winnipeg, Man.
Toronto, Ont. Vancouver, B. C.

Plate Press Felts

There is no better Plate Press Felt made than the "HAMILTON."

A trial is invited.

Satisfaction always guaranteed.

SHULER & BENNINGHOFEN
HAMILTON, OHIO

E. B. THOMAS & CO.

INCORPORATED

ALFRED J. MORAN, Manager

100 Hudson St., NEW YORK

IMPORT **EXPORT**

HIGH GRADE

Paper Manufacturers' Supplies

RAGS—PAPERSTOCK
ROPE—BAGGING
STRINGS

INQUIRIES INVITED

H. O. NUMAN

Barking Drums

Green Bay, Wis.

Domestic Raw Materials

Papermaking Rags

(Special to THE PAPER INDUSTRY)

Influenced by a better demand for roofing stock, all grades of rags are moving in larger volume and the market has appreciably strengthened. Owners of rags continue to ask prices which manufacturers in frequest instances assert they are not justified in paying, yet there is less reluctance shown by buyers to meet the figures quoted, which seems to be ample proof that consumers are more in need of fresh supplies. No. 1 roofing rags are selling at around 1.80 cents per pound f. o. b. New York, and offerings at this and even higher prices are none too plentiful. Indications are that dealers view the future of the roofing market with a bullish attitude, and are holding back supplies in anticipation of being enabled to get higher prices later on. Thirds and blues of repacked quality are held at 3.15 to 3.25 cents, with some producers who put up choice packing asking more. Old No. 1 whites are quoted at 5.50 to 5.75 cents for No. 1 grade and 4.00 to 4.25 cents for No. 2 packing. New cuttings are in moderate demand and firmly quoted. No. 1 white shirt cuttings have moved up a peg in price, and dealers as a rule are now asking 10.50 cents a pound New York for sizable amounts. Fancies, muslins, lawns and overall cuttings are moving in a consistent manner though in restricted lots. Prices f. o. b. New York follow:

	New York and Chicago
White shirt cuttings, No. 1	10.25-10.50
White shirt cuttings, No. 2	7.00- 7.25
Fancy shirt cuttings	7.75- 8.00
Washables, No. 1	6.75- 7.00
Unbleached muslins	9.00- 9.50
White lawns	9.00- 9.25
Overall cuttings, blue	8.00- 8.25
Black silesias	4.50- 4.75
Old Stock—	
Whites, No. 1 repacked	5.50- 5.75
Whites, No. 2 repacked	4.00- 4.25
Whites, house soiled	3.10- 3.25
Whites, street soiled	2.90- 3.00
Thirds and blues, repacked	3.15- 3.25
Thirds and blues, rough	2.80- 2.90
Black stockings	2.65- 2.75
Lace curtains	6.00- 6.25
Cotton canvas, No. 1	4.75- 5.00
White cotton batting	4.60- 4.80
Roofing, No. 1	1.75- 1.85
Roofing, No. 2	1.60- 1.70

Old Papers

Of all descriptions of papermaking material, waste paper is at present in relatively poorest demand. This apparently is due to the fact that box board mills are not as busily engaged, on the whole, as are paper manufacturers, so that the outlet for supplies of old paper is not as broad as that for rags, ropes, wood pulp and other fibres. Prices on practically all grades of waste paper have steadily declined during the past several weeks and now prevail on levels where they are sustained only by the inability of packers to produce stock for less. All room for profit for the dealer is eliminated under present values, and producers have reduced their output to the lowest possible ebb. No. 1 soft white shavings are being freely offered at mills at around 2.75 cents a pound f. o. b. New York, and there are few buyers in view even at this low price. Hard white shavings of No. 1 quality are quoted at 3.85 to 4.00 cents, while No. 1 kraft paper is available at 2.00 to 2.15 cents and ledger stock at about the same figures. Books and magazines are in fair demand, with most of the stock moving out of this market going to the West at prices ranging from 1.25 to 1.35 cents New York. No. 1 mixed paper is selling at 40 cents per hundred pounds and folded newspapers at 50 cents. F. o. b. New York quotations are:

	New York and Chicago
Hard white shavings, No. 1	3.85-4.00
Hard white shavings, No. 2-3	3.40-3.60
Soft white shavings	2.85-3.00
Heavy book, No. 1	1.75-1.85
Colored shavings	1.10-1.20
Heavy flat stock, No. 1	1.35-1.50
Crumpled, No. 1	1.10-1.20
Ledger stock	2.35-2.50
Kraft, No. 1	2.15-2.45
Manilas, No. 1	1.00-1.10
White blank news	1.25-1.50
Overissue news, No. 1	.95-1.00
Folded news	.80- .85
Mill wrappers	.90-1.00
Box board cuttings	.60- .70
Mixed paper, No. 1	.55- .60
Common paper	.40- .45

Rope and Bagging

Notwithstanding the comparatively heavy receipts of foreign rope recently, there is a strong tone to prices on old Manila rope and sales have been

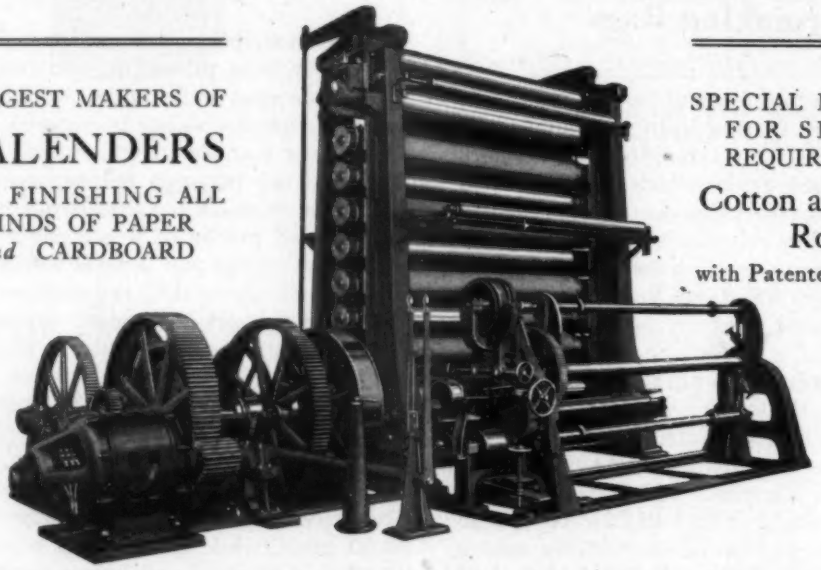
(*Continued on page* 153)

Holyoke Machine Co. HOLYOKE MASS.

Makers of Improved Machinery for Wood Pulp & Paper Mills

LARGEST MAKERS OF
CALENDERS
FOR FINISHING ALL KINDS OF PAPER *and* CARDBOARD

SPECIAL MACHINES FOR SPECIAL REQUIREMENTS
Cotton and Paper Rolls
with Patented Fastenings



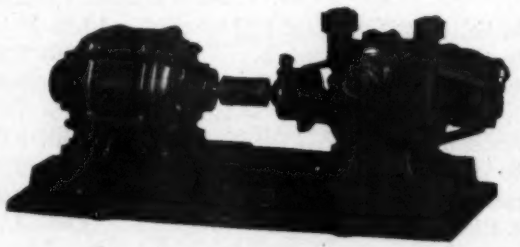
Efficiency——Reliability——Durability

ARE CHARACTERISTICS OF THE

Nash Hydro-Turbine Vacuum Pumps

Nash Hydro-Turbine Air Compressors

Jennings Hydro-Turbine Dryer Exhaust Units



Jennings Hydro Turbine Dryer Exhaust Unit

Minimum Cost, Maintenance and Repair with Maximum Power

FOR FULL PARTICULARS ADDRESS

THOMAS H. SAVERY, Jr. 1718 Republic Building Chicago, Illinois

(*Continued from page* 151)

recorded establishing values on higher levels. Dealers now quote from 4.50 to 4.75 cents a pound f. o. b. New York for strictly No. 1 rope, and judging by the reluctance shown in accepting orders, many of them are sold ahead. Strings are in better demand and firm in price at a quotational range of 2.00 to 2.25c per pound basis for mixed strings. Bagging is in fair call and quotations are maintained. Manufacturers are absorbing larger amounts of gunny and freely paying the prices asked. Quotations are:

	New York and Chicago
Gunny, No. 1 domestic	2.75-3.00
Gunny, No. 1 foreign	3.00-3.25
Scrap bagging, No. 1	2.10-2.25
Roofing bagging	1.50-1.60
Wool tares, heavy	2.75-3.00
Wool tares, light	2.60-2.75
Manila rope, No. 1 foreign	4.50-4.75
Manila rope, No. 1 domestic	4.50-4.75
Sisal strings	2.00-2.25
Mixed strings	2.00-2.25

(*Continued from Page* 149)

manufacturers from different lines all over the country.

Possibly the most interesting of all of the meetings, to the largest number, was that of the Cost Finding Association, something that is growing very fast in this great industry as it seems to be felt that it is high time that most of the mills really understand what their accounts are in order to be able to able to make the proper figure for the selling price.

On Thursday at 10 a. m., Mr. John R. Long, of the Taretum Paper Mills, Tarentum, Pa., gave a talk as to the value of Cost Finding; at 2:30 that afternoon Mr. J. P. Sill, of the Wausau Sulphate Fibre Co., Mosinee, Wis., gave an address, after which President D. E. Buchell, of the Cost Association, also delivered an eloquent address.

Many of the mills were represented at the different meetings by the President or General Manager, also many had their Cost Accountants present at the meeting so that these men could better understand what Cost Accounting meant, and get some idea of how to go about working out a system for themselves.

There were many meetings of the different sections of manufacturers of different grades at which there were group organizations formed.

Cost Finding is one of the important things in the manufacture of paper, and many interesting articles along this line will be published from time to time in THE PAPER INDUSTRY.

Chicago was filled with paper manufacturers and paper dealers the week of May 12th. Aside from the meeting of the Cost Association of the paper industry, which was held at the Blackstone Hotel, May 14th and 15th, there was also a meeting on Tuesday of the Book Paper Manufacturers, which was formed into an association as an adjunct to the American Paper and Pulp Association. Wednesday there was a meeting of the Cover Paper Manufacturers' Association; on Thursday of the Sulphite Bond Paper Manufacturers, and this was formed into an association, to also be an adjunct of the American Paper and Pulp Association; Friday there was a meeting of the Writing Paper Manufacturers' Association, and after their preliminary work there was an eloquent address given by Mr. Harry A. Wheeler, president of the Chicago Chemical Commerce.

All of these meetings were largely attended by men interested in these different lines, and held at the Blackstone Hotel.

On Tuesday the Board of Directors of the National Paper Trade Association held a meeting in Chicago. All of these gentlemen stayed over for the meeting on Wednesday of the Western Paper Merchants' Association, and had as their guests members of the North Western Paper Trade Association, and the Central States Paper Trade Association, which was held at the Congress Hotel in the Gold Room, where a banquet was served and cabaret enjoyed by the members.

Among the prominent dealers were:

A. T. Platt, president of the National Paper Trade Association.

W. C. Ridgeway, secretary of the National Paper Trade Association.

R. P. Andrews, vice president Fine Paper Division.

E. P. Herlinger, vice president of the Coarse Division of the National Paper Trade Association.

S. J. Hodgins, president of the Missouri Valley Association.

A. E. Dubey, president of the Paper Trade Association of New York.

E. H. Naylor presided at all of the meetings of the different paper manufacturers, while L. B. Stewart, secretary of the American Paper and Pulp Association was on hand to help in the work of boosting the Cost Association of the paper industry.

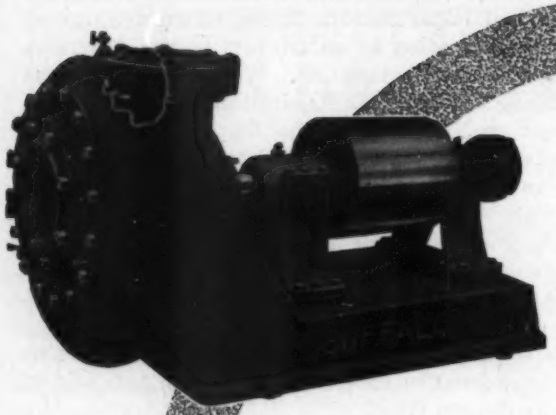
Foamy Glues

Glue which is foamy when spread is likely to give unsatisfactory results, owing to the formation of dry spots in the joints by the air bubbles.

A loss of 25 per cent has been noted by the Forest Products Laboratory in the shear strength of plywood, due to the use of foamy glue, and even greater losses were found when the glue coat was heavy.

Foaming in animal glues may be caused by running the spreader too rapidly, or by running it idle, or by over-heating the glue. Foaming is also dependent on the amount of grease the glue contains, the kind of stock used and the method of manufacture. Alka-

(*Continued on page* 155)



"Buffalo" Paper Pump

Designed and built to eliminate clogging

Buffalo Paper Makers Pumps are designed to meet the requirements of the paper manufacturer—for handling ground wood stock.

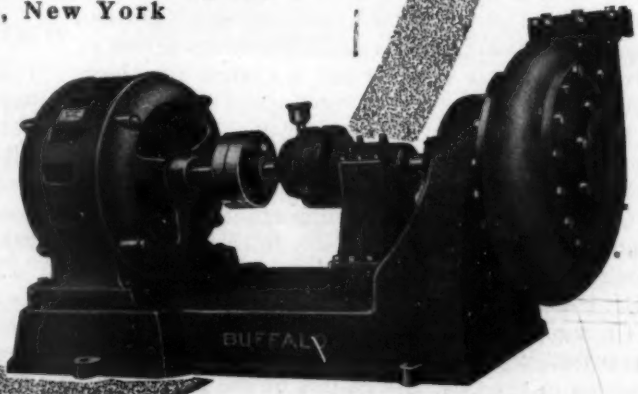
They are in successful use in the largest paper mills in the country for handling ground wood pulp.

Handles wood stock up to 4%

Built for heavy duty continuous service—non-clogging—special designed impeller with extra wide openings.

Write for Circular 248-27

Buffalo Steam Pump Company
Buffalo, New York



New Papers

(Special to THE PAPER INDUSTRY).

Writing—	
White rag	15- 35
White sulphite, No. 1	11- 25
Colored	12½-17
Ledger—	
White rag	18- 38½
White sulphite	18- ..
Colored sulphite	19½-..
Colored rag	21- ..
Bonds—	
White rag	15- 45
White sulphite	12- 20
Colored sulphite	13- 25
Colored rag	15- 45
Book—	
No. 1 S. & S. C.	7.75- 8.50
Machine finished	7.50- 8.25
English finished	8.00-12.00
Coated and enamel	9.50-13.00
Lithograph	10.00-11.00
News Print—	
Rolls, contract	3.75- 4.00
Rolls, transient	4.00- 4.25
Sheets	4.50- 4.75
Side runs	3.75- 4.00
Standard natural rolls	3.75- 4.25
Cover Stock—	
Coated, both sides	12.25-....
Coated, one side	12.00-....
Wrappings—	
No. 1 kraft	7.25- 7.50
No. 2 kraft	6.25- 6.50

Boards—	New York	Chicago
Solid news	45.00-52.50	45.00-47.00
Straw	35.00-37.50	35.00-37.50
Plain chip	37.50-42.50	40.00-42.50
White coated chip	60.00-65.00	60.00-62.50
Manila coated chip	60.00-65.00	60.00-62.50
Binders board	70.00-75.00	75.00-80.00

Mechanical Pulp

The shutdown of the mills of the International Paper Company by the strike of operatives has failed to have material effect on the ground wood market, which rules steady and fairly active. The great bulk of business now being done in mechanical pulp consists of shipments by manufacturers to contract customers, for transient buyers are absorbing only limited tonnages. Consumption, however, has increased to the point where it closely approximates the current production, and with producers having less pulp to direct to the open market, there is not so much selling pressure in evidence and the tone of prices is stronger. Another bullish market factor is that Canadian grinders are exporting appreciable quantities of pulp to England, which, of course, means the elimination of just so much of a supply for American consumers. Between $26 and $27 per ton at the grinding plant is the range of quotations issued by eastern manufacturers.

Chemical Pulp

Demand for domestic chemical pulp has quickened to a marked degree during the past several weeks. Papermakers have been in the market in more extensive number than for a long time, and while the majority of them have restricted the volume of their orders, the aggregate movement into consuming channels has gradually increased until now it is bordering close onto normal. Prices are better established than they have been in a lengthy period, and in certain cases, particularly as regards soda pulp, the trend of values is upward. Bleached sulphite is sought in good volume and sales at 5.25 to 5.75 cents per pound, depending on the quality of the pulp and the tonnage involved, are frequently recorded. News grade sulphite is moving freely at $65 to $70 a ton and easy bleaching sulphite is firmly quoted at $85 to $95. Bleached soda pulp is not available in sizable parcels under $87.50 per ton and is actively inquired for. Kraft is the weakest item in the market, this being partially due to the comparatively slow operation of board mills and partially to the offerings of imported kraft pulp at low prices. Quotations f. o. b. producing mills are:

(Corrections)	
Bleached sulphite	5.25-5.75
Kraft, No. 1	3.75-4.00
Screenings, refined	1.25-1.50

(*Continued from page* 153)

line glues are more subject to foaming than glues of acid reaction. Unless a special foamless glue, which most manufacturers are prepared to furnish, is used, or some more desirable preventive measure is taken, the addition of a little grease or oil may allay foaming troubles in animal glue. Fish oil, corn oil, mineral oil and preparations containing tallow are in use for this purpose.

Foaming in casein glue is commonly the result of mixing at too high a speed or for too long a time. Casein glue mixed at high speed may have twice the volume it would have if mixed at the proper speed, owing to the incorporation of air.

The Stickle Automatic Steam Control for Paper Machines

WE wish to emphasize the word "automatic." This with us means that the steam follows changes that come to the sheet from free to hard drying stock or any ordinary changes in weights. A control that does not do this in itself is not automatic. This makes a better sheet of paper. We guarantee to hold the moisture at any point you wish with ½ of 1% change. Furnished on 60 days' approval.

OPEN COIL HEATER & PURIFIER CO.
INDIANAPOLIS, IND.
BOSTON PHILADELPHIA

REX Paper Company

Manufacturers of

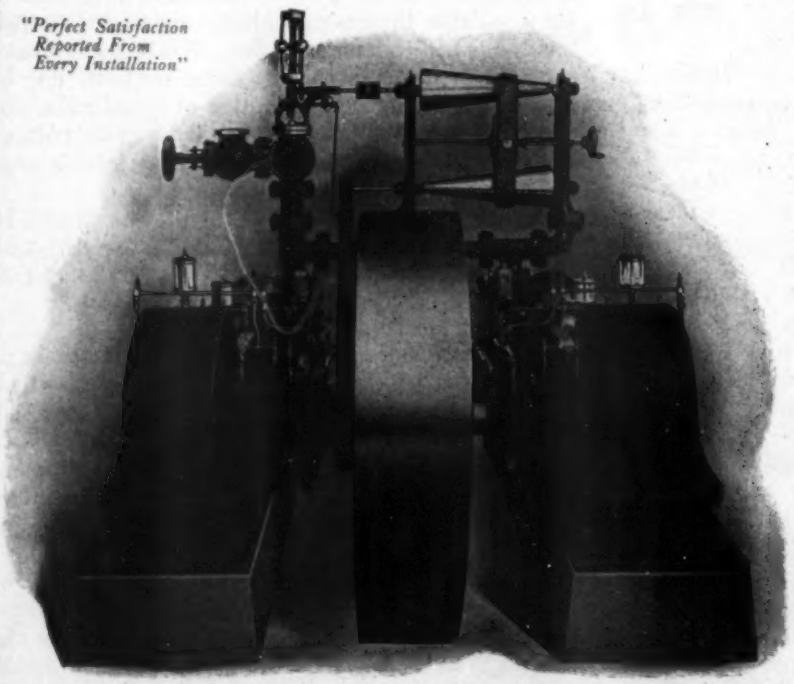
Coated and Offset

Papers

Kalamazoo, Michigan

Large, Modern Designed ENGINES

"Perfect Satisfaction Reported From Every Installation"



Most Convenient for Use —Adjustment and Care

well describes the "ERIE" double variable speed engines. THEY WILL REDUCE YOUR COST by giving uniform production at all desired speeds. Prompt deliveries, reasonable price.

To the Paper Mill Trade

Repeat orders have without exception been arranged with every user of these engines who has had subsequent requirements, and we will be glad to furnish definite references and full information as to price, delivery and equipment to meet your requirements, and will appreciate an opportunity to furnish these details by mail and the privilege of personal interviews being arranged.

MANUFACTURED BY

Erie Engine Works

ESTABLISHED **Erie, Pa.** *40 YEARS*

Special Sales Representatives

New York—W. B. Connor, Inc., 90 West Street.
Boston—Schumaker-Santry Co., 141 Milk Street.
Chicago—E. E. Maher, 818-819 Michigan Boulevard Building.

(Special to THE PAPER INDUSTRY)

Wood Pulp—Very little Scandinavian pulp is now being imported into the United States. Conditions are so uncertain, and prices ruling on the other side are so far beyond a parity with market values here that importers are refusing flatly to bring pulp in on their own account and are restricting their operations to the placing of occasional contracts with mills in Sweden and Norway for consumers here. Spot lots of pulp are being offered by holders at prices substantially under the prevailing cost of replacement, which would indicate that owners of such supplies as are available on the docks or in warehouses are anxious to dispose of stocks. Scandinavian kraft in particular is weak, with sales reported at as low as 3.50 cents a pound ex dock. It is understood that there are large stocks of kraft in Sweden awaiting shipment, which probably accounts for the cutting of prices on spot pulp. Receipts during the past month and current market quotations are as follows:

Funch, Edye & Co., 2 pkgs. from Copenhagen.

Tidewater Paper Mills, 4,502 bbls. ground wood from Liverpool, N .S.

American Woodpulp Corpn., 204 bbls. from Copenhagen.

J. Andersen & Co., 1 pkg. from Christiania.

Foreign Trade Opportunities

The representative of a firm in Japan is at present in this country and desires to secure an agency and purchase dyestuffs and pulp and paper mill machinery. References will be given. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29324.

A firm in France desires to secure an exclusive agency and to purchase wrapping paper. Terms of payment cash against documents, 30 days. Correspondence should be in French. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 28896.

Capt. J. R. Robinson is to leave on Thursday on a long trip through South America in the interests of the J. W. Butler Paper Company. Capt. Robinson told members of the foreign trade club of the Association of Commerce, who met at the Morrison hotel last night, with Dr. Jose Santiago Rodriguez of Venezuela as their guest of honor, that he is to go as a "trade missionary" and that he is not to sell a dollar's worth of goods.

Instead of making sales, Capt. Robinson will study conditions in all countries as they relate to the paper trade, and will bring back a list of all big users of paper in South America, as well as information regarding their exact needs. He will be away a year or eighteen months.

A firm in England desires to purchase from manufacturers various kinds of paper. Quotations should be f. o. b. New York. Terms cash in New York against documents. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 28112.

An agency is desired by a man in Italy for the sale of raw materials for paper mills. Correspondence may be in English. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29022.

A man in Sweden wishes to purchase machinery for papermaking. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29064.

A company in Norway desires to purchase and secure an agency for the sale of paper and miscellaneous paper products. Payment will be made against documents. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29062.

A firm in Sweden is especially interested in purchasing machinery and other equipment for wood pulp and paper mills. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29117.

A man in France desires to purchase and secure an agency for the sale of carbon paper. He desires to deal directly with manufacturers only. Correspondence should be in French. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29078.

The LINDSAY Wire Weaving Company

Manufacturers of

DEPENDABLE FOURDRINIER WIRES

Cylinder Covers and Other Paper Machine Wire Cloth

All Well Made at

Collinwood Station CLEVELAND, OHIO

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

AGITATOR EQUIPMENT
The Hill Clutch Co., Cleveland, Ohio.

ANGLE VALES
The Crane Company, Chicago, Ill.

ARCHITECTS
James L. Carey, 208 N. Laramie St., Chicago, Ill.

ASSORTING TABLES
Moore and White Co., Philadelphia, Pa.

ASH CONVEYOR SYSTEMS
American Steam Conveyor Corp., Chicago, Ill.

BARKERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

BARKING DRUMS
H. O. Numan, Green Bay, Wis.

BEATER BARS
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.

BEATER BED PLATES
John W. Bolton & Sons, Inc., Lawrence, Mass.

BEATER ROLL FILLING
R. J. Dowd Knife Works, Beloit, Wis.

BEATING, WASHING AND BLEACHING ENGINES
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

BELTING (Rubber)
United States Rubber Co., New York and Chicago

BELT DRIVES
The Hill Clutch Co., Cleveland, Ohio.

BLEACHING (Propellers)
Moore and White Co., Philadelphia, Pa.

BLOWERS
Buffalo Steam Pump Co., Buffalo, N. Y.

BOARDS (Straw)
The C. L. La Boiteaux Co., Cincinnati, O.

BRASS WIRE CLOTH
Appleton Wire Works, Appleton, Wis.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

BUNDLING SYSTEMS
Signode System, Lake St., Chicago

CALENDERS
Holyoke Machine Co., Holyoke, Mass.

CALENDER DOCTORS
Ticonderoga Machine Works, Ticonderoga, N. Y.

CALENDER ROLLS
Holyoke Machine Co., Holyoke, Mass.
B. F. Perkins and Son, Inc., Holyoke, Mass.

CENTRIFUGAL PUMPS
Buffalo Steam Pump Co., Buffalo, N. Y.
Valley Iron Works Co., Appleton, Wis.

CHIPPERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

CHIPPER AND BARKER KNIVES
Simonds Manufacturing Co., Fitchburg, Mass.

COAL BURNERS
Thos. H. Savery, Republic Bldg., Chicago, Ill.

COAL BUNKERS
The Brownhoist Co., Cleveland, Ohio.

CONDENSERS
Buffalo Foundry and Machine Co., Buffalo, N. Y.

CRANES
Northern Engineering Works, Detroit, Mich.
The Brownhoist Co., Cleveland, Ohio.

CUTTING MACHINERY
Moore and White Co., Philadelphia, Pa.

DAMP-PROOFING COMPOSITIONS
The Trus-Con Laboratories, Detroit, Mich.

DANDY ROLLS
Appleton Wire Works, Appleton, Wis.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

DECKEL FRAME SUPPORTS
Huband and Nash, Menasha, Wis.

DIGESTER QUARTZ
Wausau Quarts Co., Wausau, Wis.

DRUM WINDERS
Ticonderoga Machine Co., Ticonderoga, N. Y.

DRYERS (Vacuum)
Buffalo Foundry and Machine Co., Buffalo, N. Y.

DRYER FELTS
Shuler and Benninghofen, Hamilton, Ohio.

ELECTRIC FANS
B. F. Perkins and Sons, Inc., Holyoke, Mass.

ELECTRIC HOISTS
Northern Engineering Co., Detroit, Mich.

ELEVATING TRUCKS
Economy Engineering Co., Chicago, Ill.
Moore and White, Philadelphia, Pa.

ENGINES
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, Ohio.

ENGINEERS
James L. Carey, 208 North Laramie St., Chicago, Ill.

EVAPORATORS
Buffalo Foundry and Machine Co., Buffalo, N. Y.

FASTENERS (Screen Plate)
Union Screen Plate Co., Fitchburg, Mass.

FELTS AND JACKETS
Shuler and Benninghofen, Hamilton, Ohio.

FELT AND WIRE GUIDES
Huband and Nash, Menasha, Wis.
Moore & White Co., Philadelphia, Pa.

FOURDRINIER WIRES
Appleton Wire Works, Appleton, Wis.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

FILTRATION MEDIUMS
Wausau Quartz Co., Wausau, Wis.

FILTRATION PLANTS
Hungerford & Terry, Inc., Pennsylvania Bldg., Philadelphia, Pa.
Wm. Graver Tank Works, East Chicago, Ind.
Wm. B. Scaife and Sons Co., Oakmont, Pa.

FILTER (Continuous Suction)
Green Bay Foundry & Machine Co., Green Bay, Wis.
Hungerford & Terry, Pennsylvania Building, Philadelphia, Pa.

FRICTION CLUTCHES
The Hill Clutch Co., Cleveland, Ohio.
Moore and White Co., Philadelphia, Pa.

GEARS
The Hill Clutch Co., Cleveland, Ohio.

GRINDERS
Holyoke Machine Co., Holyoke, Mass.

HOISTS
Northern Engineering Co., Detroit, Mich.

HYDRAULIC TURBINES
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.

KNIVES
R. J. Dowd Knife Works, Beloit, Wis.
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.

LAYBOYS
Moore and White Co., Philadelphia, Pa.

LIFTS
Economy Engineering Co., Chicago, Ill.

LINE SHAFT BEARINGS
The Hill Clutch Co., Cleveland, Ohio.

MACHINE DRYER TEMP. CONTROL
Open Coil Heater and Purifier Co., Indianapolis, Ind.

MILL WHITE
The Trus-Con Laboratories, Detroit, Mich.

PAPER BOARDS
F. D. Wilson, 1520 Lumber Exchange Building, Chicago, Ill.
The C. L. La Boiteaux Co., 200 Fifth Ave., N. Y.

PAPER CUTTERS
The Seybold Machine Co., Dayton, Ohio.

PAPER DISTRIBUTORS
Bermingham and Prosser, Chicago, Ill.
Seaman Paper Co., Chicago, Ill.

PAPER MANUFACTURERS
Bardeen Paper Co., Otsego, Mich.
Bryant Paper Co., Kalamazoo, Mich.
Lakeside Paper Co., Neenah, Wis.
Rex Paper Co., Kalamazoo, Mich.
Monarch Paper Co., Kalamazoo, Mich.
Northern Paper Mills, Green Bay, Wis.
Watervliet Paper Co., Watervliet, Mich.
Wausau Sulphate Fibre Co., Mosinee, Wis.
Wheat Paper Co., Elkhart, Ind.
Wolverine Paper Co., Otsego, Mich.

PAPER TESTERS
B. F. Perkins and Son, Inc., Holyoke, Mass.

PARCHMENT MANUFACTURERS
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Sutherland Paper Co., Kalamazoo, Mich.

POWER TRANSMISSION
The Hill Clutch Co., Cleveland, Ohio.

PULLEYS (Friction Clutch)
The Hill Clutch Co., Cleveland, Ohio.

PULP GRINDERS
Holyoke Machine Co., Holyoke, Mass.

PULP WASHERS
The Green Bay Foundry and Machine Co., Green Bay, Wis.

PUMPS (Paper)
Buffalo Steam Pump Co., Buffalo, N. Y.

PUMPS (Vacuum)
Buffalo Foundry and Machine Co., Buffalo, N. Y.
Thos. H. Savery, Republic Bldg., Chicago, Ill.

RAG AND PAPER DUSTERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works, Appleton, Wis.

RUBBER ROLLS
United States Rubber Co., New York and Chicago

ROTARY SCREEN
Thos. H. Savery, Republic Bldg., Chicago, Ill.

SAVE-ALLS
The Green Bay Foundry and Machine Co., Green Bay, Wis.

SAWS
Simonds Manufacturing Co., Fitchburg, Mass.

SCREEN PLATES
Union Screen Plate Co., Fitchburg, Mass.

SHOWER PIPES
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SLITTING AND REWINDING MACHINERY
Cameron Machine Co., Brooklyn, N. Y.

SPEED CHANGES
Moore and White Co., Philadelphia, Pa.

STEAM JET CONVEYORS
American Steam Conveyor Corp., Chicago, Ill.

STEAM SEPARATORS
The Crane Co., Chicago, Ill.

STOCK CIRCULATING SYSTEM
Ticonderoga Machine Works, Ticonderoga, N. Y.
Claflin Engineering Co., Lancaster, Ohio.

STOCK PUMPS
Buffalo Steam Pump Co., Buffalo, N. Y.

STOCK SHREDDER
The Green Bay Foundry and Machine Co., Green Bay, Wis.

SUCTION ROLLS
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SULPHUR BURNERS
Valley Iron Works Co., Appleton, Wis.

TIERING MACHINES
Economy Engineering Co., Chicago, Ill.

TURBINES (Water)
James Leffel and Co., Springfield, Ohio.

VACUUM SYSTEMS
Open Coil Heater and Purifier Co., Indianapolis, Ind.

VALVES
The Crane Co., Chicago, Ill.

VARIABLE SPEED ENGINES
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, O.

VENTILATING SYSTEMS
Buffalo Steam Pump Co., Buffalo, N. Y.
B. F. Perkins and Son, Inc., Holyoke, Mass.

WATER FILTER
The Green Bay Foundry and Machine Co., Green Bay, Wis.

WATER PROOFING
The Trus-Con Laboratories, Detroit, Mich.

WATER-SOFTENING AND PURIFYING SYSTEMS
Wm. Graver Tank Works, East Chicago, Ind.
Wm. B. Scaife and Sons Co., Oakmont, Pa.

WATER WHEELS
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.

WELDING OUTFITS
Imperial Brass Mfg. Co., Chicago, Ill.

WET MACHINES
Valley Iron Works Co., Appleton, Wis.

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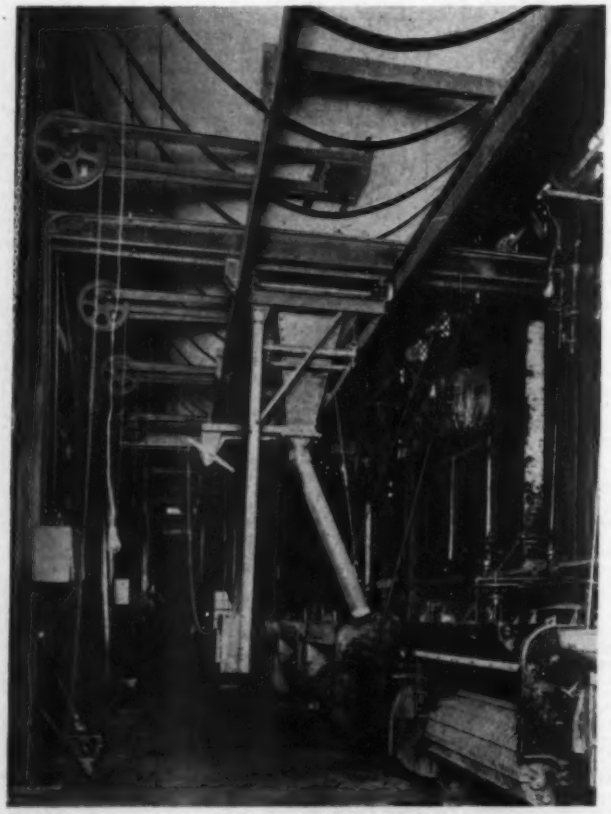
"The Standard of Excellence"

"Northern" Toilet Papers
"Northern" Inter-Folded Towels
"Northern" Roll Towels

CAPACITY 100,000 LBS. PER DAY

NORTHERN PAPER MILLS, GREEN BAY, WIS.



Brownhoist Locomotive Cranes *and* Concrete Coal Bins

Are Absolute *Necessities* in All Pulp and Paper Mills

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Coal Handling Machinery	Transfer Cars
Trolleys	Lorries
Tramrail Systems	Buckets
Hand Traveling Cranes	Tubs
Electric Hoists	Concrete Bins
Mono-rail Systems	Wharf Cranes
Crabs and Winches	Hoists

THE BROWN HOISTING MACHINERY CO.
Cleveland, Ohio, U. S. A.

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300

DAILY CAPACITY IN TONS

Standard Grades of Paper Boards

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ALTON BOX BOARD & PAPER COMPANY

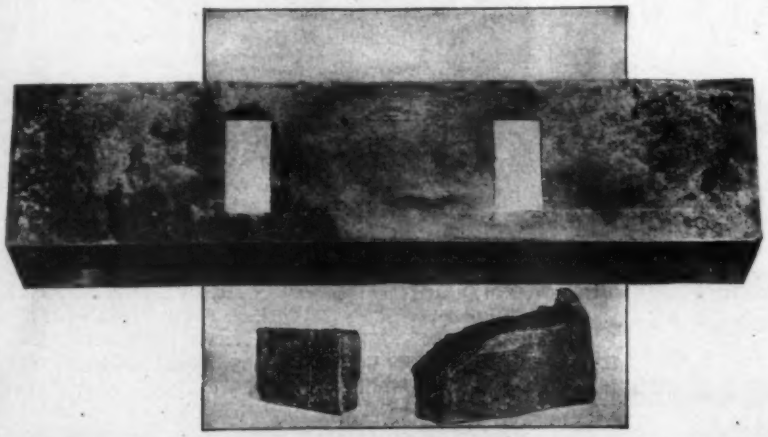
CHICAGO COATED BOARD COMPANY

SALES DEPARTMENT
Office: 1520 Lumber Exchange Building
CHICAGO, ILL.

F. D. WILSON, Sales Manager
Address all communications regarding sales to this office

SIMONDS CHIPPER KNIVES Withstand UNUSUAL TEST

The Chipper Knife pictured herewith is a Simonds which is being operated at the Orono Pulp & Paper Company's Mill in Maine. It cut through a wedge two inches square and seven inches long which was imbedded in a 10-inch log. The knife cut the wedge as illustrated. After a grind of ⅛ inch it was ready for duty again. More evidence that Simonds Knives have no equal.



We manufacture all kinds of machine knives.

SIMONDS Manufacturing Co.
"The Saw Makers"
FITCHBURG, MASS.
5 Factories 12 Branches